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EDITED BY

SIR JOHN Y. W. MACALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE TWELFTH

SESSION 1918-19

PART III

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I

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SECTION OF OBSTETRICS & GYNÆCOLOGY

LONDON
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Section of Obstetrics and Gynæcology.

President—Mr. J. D. MALCOLM, F.R.C.S.Ed.

PRESIDENT'S ADDRESS.

Developments in Abdominal Surgery since 1884.[1]

By JOHN D. MALCOLM, F.R.C.S.Ed.

A STRIKING illustration of the changes in abdominal surgery is found in the nursing conditions. When I first knew this work each patient at the Samaritan Free Hospital had a room set apart for her own use in which the operation was performed, and in which she remained during the first five or six days of convalescence. She was attended to by one nurse who, with as little assistance as possible, was in sole charge until the patient was considered out of danger. In a simple case this meant two or three days of constant attention followed by two or three days in which the work was fairly easy. The nurses seemed to learn to sleep when the patient slept, and to awake with the patient, and sometimes they would look after a serious case for ten days or more. I believe most of them were taught their work in the Samaritan Free Hospital, and therefore they had no pretention to being what is now called fully trained, but they knew all that was known at that time about the care of cases of abdominal surgery. They were keenly jealous of their right to "see a case through" the period immediately following an operation, and when the time came to adopt night and day shifts some of these women positively resented the change.

This system continued for about seven years after I joined the hospital in 1884. At that date Spencer Wells had retired from the acting staff, and the abdominal surgery was carried on chiefly by Knowsley Thornton and Granville Bantock.

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[1] At a meeting of the Section, held November 7, 1918.

The surgeons to the hospital were not supposed to undertake any operations by way of the vagina; all procedures by that route were handed over to the so-called physicians, to whom opening the abdomen was forbidden, the method of approaching the peritoneal cavity through the vagina not being then more than a very rare procedure. This division of the work was made in the belief that vaginal manipulation caused such a contamination of the hands and person of the operator that he could not safely open the peritoneal cavity for many days afterwards. That view was acted upon, although the surgeon did regularly examine his patients through the vagina, this being of course often necessary for diagnostic purposes.

The isolation of the operator upon the abdomen as much as possible from all sources of contamination was one of the early results of Lister's teaching, which was then very generally accepted by the profession. Knowsley Thornton carried out fully Lister's methods in their latest development. Stated shortly, these involved the utmost cleanliness of everything coming in contact with wounded structures supplemented by a bacteriological cleanliness obtained by the use of a $2\frac{1}{2}$ per cent. solution of carbolic acid as a lotion for cleaning exposed structures, and in which instruments and sponges were kept until required. A spray of carbolic acid solution was arranged to cover the whole area of the operation, and to prevent the access of living organisms to the wound from the air. Incidentally this spray had a very chilling effect upon everything it touched, which could only be harmful to the patient. There was no boiling of instruments, and rubber gloves were not then employed. Marine sponges were used as swabs. Little attention was paid to the irritating nature of the carbolic acid, and in cases of rupture of an ovarian tumour with glutinous contents, practically the whole intestine would sometimes be scrubbed from end to end before the toilet of the peritoneum, as the cleaning process was called, was considered complete. Very often after such energetic treatment an altogether uninterrupted convalescence followed.

Although this antiseptic method was very generally practised, a small minority of surgeons, headed by Lawson Tait and represented in the Samaritan Free Hospital by Granville Bantock, opposed Lister's teaching strenuously, with a bitterness which was very remarkable, and which seems to crop up from time to time in connexion with this subject.

The opponents of Lister maintained that a solution of carbolic acid when applied to raw tissues and to the peritoneum was harmful to these structures, and that no chemical solutions were necessary. We all know now that this is true if the raw tissues and peritoneum are not contaminated. But when the holders of these new views scoffed, as they did, at Lister's teaching, they clearly did not understand what they were discussing, and this ignorance led to frequent disasters.

The central idea of Lister's teaching was in no way concerned with or dependent upon the use of carbolic acid. He has left a definition of his views which might have been cunningly devised with a foreknowledge of the wrangling which was to take place, and with the definite object of confounding criticism. He wrote that "the antiseptic system of treatment consists of such management of a surgical case as shall effectually prevent the occurrence of putrefaction in the part concerned."[1] The essential fact taught by Lister was that the presence and growth of putrefactive organisms is the chief cause of the prevention of healing of injured animal tissues, and his definition encompasses all our modern methods, whether by sterilizing by heat, by attempts to wash away or kill putrefactive organisms already lodged in the tissues, or by means directed to increasing the power of living structures to resist and destroy pathogenic organisms. In fact every known and every unknown method of attaining asepticity in a wound must come under the conditions of Lister's definition of his antiseptic system which is quoted above, and however brilliant and original any future new method of attaining asepsis may be its author will deserve the more credit if he freely acknowledges that he is adding a detail in full harmony with Lister's teaching, the essential feature of which must remain unchanged.

The supporters and the opponents of Lister were also sharply at variance on the question of giving or withholding opium during the convalescence of a case of abdominal surgery. The adherents of Lister were dominated by the fear of an onset of peritonitis, and by the belief that opium was a specific for this condition. To bind up the bowels for the best part of a week was the orthodox treatment. For this purpose 20 minims of tincture of opium were administered *per rectum* every six hours, and additional doses were given if there was any complaint of pain. As little as possible in the way of food and even of fluid was given by the mouth. Three ounces of beef tea were administered by the bowel every three hours. Occasionally the rectum was washed out by small quantities of water. Large injections were avoided because the last thing desired was an early movement of the bowels. No attempt was made to supply fluids to the body in large quantities after an operation. An important point of the treatment was the passage of a tube into the rectum every three hours before each injection of beef tea, to allow of the escape of any remains of the last injection, and of any gases which had come down to the rectum. If gases escaped freely the patient usually made a good recovery. If they did not escape at all the patient died. The attempt to bind up the bowels was a survival from the time when there was no surgery of the peritoneum beyond an occasional operation for the relief of a strangulated hernia, and when patients who could not recover whilst the bowels were firmly locked up had to die. The new school declared that the bowels should be evacuated early, and that opium should not be given at all. Numerous attempts were made to prove the superiority of the rival methods by the publication of statistics of mortality, but neither side succeeded in showing a definite advantage, and the ill feeling which existed was, if anything, intensified by this method of argument.

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[1] Introductory Lecture, University of Edinburgh, 1869.

It was my duty to perform the post-mortem examinations at the Samaritan Free Hospital for about six years, which involved my exclusion from all participation in surgical work for a week after each autopsy. It quickly became evident that although the mortality of the old and of the new methods did not show a superiority for either, yet each had its own peculiar mode of death. With the free use of carbolic acid and a continuous administration of full doses of opium after an operation the deaths were chiefly associated with symptoms of intestinal obstruction, and after death signs of a slight diffuse peritonitis were found. A performance of many second operations in the hope of finding an intestinal obstruction showed that this diffuse peritonitis developed after the symptoms of obstruction were well advanced, and therefore this peritonitis could not be the cause of the intestinal symptoms or of the deaths which usually occurred on the fifth day. These deaths were caused by a deficient propelling power in the intestine, associated with an increased resistance to the passage of fæces through the colon, the combined effect amounting to a complete and fatal intestinal obstruction.

When chemical solutions were discontinued as lotions, cleanliness alone being relied upon, and when purgatives were used freely and early, the most common mode of death occurred about the third day after the operation, and a diffuse suppurative peritonitis was found at the autopsy. This cause of death occurred as readily after the simplest operations as after any others, and believers in the teaching of Lister had no hesitation in attributing the suppurative peritonitis to an introduction of septic infection in the course of the operation. The methods adopted, which did not include boiling of instruments, were clearly imperfect, and an occasional onset of septic peritonitis was not to be wondered at when the surgeon openly derided Lister's teaching. These deaths naturally met with angry criticism from believers in the germ theory of septic infection.

If it had not been for these cases of septic peritonitis a definite superiority in statistics of mortality would have been easily attained by the new school which would have reached almost at a bound to our modern technique. It was known that water and instruments could be sterilized by boiling and at a later date the use of rubber gloves during operations followed rapidly upon the disuse of chemical antiseptics as lotions by the followers of Lister. Coarse rubber gloves were already available for post-mortem purposes. The new school adopted empirical methods which when brought into harmony with Lister's teaching proved to be distinct advances on former treatment, but this school fought hard against the well established germ theory and thus missed a great opportunity. No advance was made until it gradually became recognized that sterilization of instruments and lotions could be effected by heat and that to bind up the intestines for a long period after an abdominal operation was harmful.

In 1884, the removal of uterine fibromata was effected by bringing the uterus out of the body through a median abdominal incision and constricting its base behind the tumours by means of a serre-nœud until the circulation was arrested. The uterus and growths were then cut away through bloodless tissue, leaving about an inch to separate by sloughing, the abdominal wall being secured round the uterus at the level of the constricting wire. The separation of the slough and healing of the wound were seldom completed under six weeks. The mortality from this operation was small if there was no drag on the constricted neck of the uterus, but the danger increased with the amount of traction and the removal of deeply placed fibroids by this method was very dangerous. In all cases the scar was weak and liable to develop a hernia, and when modern methods were introduced their superiority was quickly apparent.

One of the most important changes of method in the period under consideration was the introduction of the influence of gravity for removing the intestines from the pelvis. We now expect the patient's hips to be raised as a matter of course for all pelvic operations, and those who have always been accustomed to this do not think of what operating without it meant. Very little consideration however is necessary to recognize that, for example, the removal of the uterus for cancer of the cervix by the abdominal route as practised at the present day would be well nigh impossible with the patient on a horizontal table.

A widespread principle has been gradually evolved and has exercised an immense influence on our work. In 1884 the abdomen was rarely opened when an acute inflammation was in progress. If febrile conditions developed and increased or continued the patient was usually left to undergo a natural solution of the mischief whatever it might be. Even an operation for the removal of a newly strangulated ovarian tumour was usually postponed. Now a large proportion of our work is directed to the arrest or prevention of an onset of inflammation. This applies particularly to intestinal work. Cases of obstruction of the bowel and rupture of the bowel now give extraordinarily good results if surgical interference takes place sufficiently early. The chief object of the surgeon in these and many other cases is to anticipate danger.

The gradual evolution of preventive surgical interference has had a very definite influence upon war surgery. At the end of the South African campaign the general opinion amongst surgeons was that abdominal wounds were best left to nature, and this was the teaching when war broke out in 1914. But a rapid swing of the pendulum has taken place and now if a patient with a penetrating abdominal wound can be conveyed to a suitable place, in fairly good condition, and without too much delay, his chances of recovery are considered to be improved if the abdomen is promptly opened. Of course the death-rate is very heavy, but the patients who die would not have lived without an operation, whereas the patients who recover would almost certainly have died without surgical interference. Patients who, after a gunshot injury of the abdomen have wounds of the intestine immediately closed or treated by resection and who arrive in this country a few weeks later with their incisions firmly healed, are triumphs of modern methods of which every surgeon must feel proud. Another advance, initiated I believe chiefly by French surgeons, is also founded upon the view that surgery should be preventive whenever this is possible. I refer to the excision of gunshot wounds at the earliest possible moment. This plan cannot be adopted in every case, but when it is possible the result may be a healing by first intention substituted for a long, exhausting and perhaps dangerous or even fatal suppuration.

I have strayed somewhat from gynæcology and I should like to say one word about the relations of gynæcological surgery to that of the rest of the abdomen. At the Samaritan Free Hospital, ever since I have known it, some of the surgeons have undertaken work outside the pelvic area. In many cases this was begun because of mistakes in diagnosis or because the surgeon happened upon some complication in the course of an operation upon the female generative organs. The mistaking of a hydronephrosis for an ovarian tumour seemed to be particularly common although it is not easy to fall into this error if the possibility of doing so is remembered. A large hydronephrosis may exactly simulate an ovarian tumour in all respects except that the loin on the affected side is always absolutely dull on percussion. A need for resection of the bowel may also arise in a most unexpected manner and the discovery of appendix trouble when a salpingitis is diagnosed cannot always be avoided.

I do not know how the division of the work is arranged in the general hospitals but the appearance in our *Proceedings* from time to time of cases that are not strictly gynæcological seems to show that the boundaries of the work of the surgeon and of the gynæcologist are somewhat elastic. This is of good augury, for there is no doubt that when a surgeon, whether general or gynæcological, opens the abdomen for any cause he will best serve his patient's interests if he has sufficient knowledge and experience to deal with every condition, however unexpected, that may be found. Any rule or practice tending to limit his activities after the abdomen has been opened is unscientific and dangerous.

Statistics are not always reliable indications of good surgery, but those of the Samaritan Free Hospital in 1884 and in 1916 (the last available) are so different that they clearly indicate a great advance. The death-rate from ovariotomy in 1884 was 10 per cent.; from hysterectomy 14 per cent.; from nephrectomy (six cases) 50 per cent.; and from splenectomy (two cases) 50 per cent. The whole mortality from abdominal operations was about 14 per cent. In 1916 the mortality from operations involving the peritoneal cavity was under 4½ per cent., and this improvement took place in spite of the fact that a very much larger and more dangerous area of operative work was covered in 1916.

The points which I have noted show clearly that the abdominal surgery of thirty-four years ago has undergone vast changes for the better. The advances have, on the whole, been gradual and it is of course easier to reduce a mortality of 14 per cent. than one of 4½ per cent., but I have no doubt that thirty-four years hence my successor in this chair will, if so minded, be able to show that many of the methods of to-day have been improved almost beyond recognition. We cannot of course count upon such advances as those made by Lister and by Morton, yet such are possible, and this is an age of big events. One advance outside the limits of our professional work, but of a purely scientific nature, may be mentioned. It is just ten years (last September) since Wilbur Wright gave his first exhibition of flying in this country, and how many of us as late as the spring of 1914 believed that flying was of no practical use? Yet the superiority of the Allies in aviation has been one of the chief factors in winning the war. So, at any moment, some great surgical advance may arise. The cancer problem still seeks a solution and septic infection is often beyond our control.

I trust that we will bear a large share in effecting the advances which will certainly take place and may I be allowed to express the opinion that the time has now come when we, as a Section, should endeavour to throw off the inertia which has overtaken our work as a consequence of the war. The number of our meetings of course depends upon the directions of the Council and still more upon the activity of the members. If you, ladies and gentlemen, do not send in sufficient material for consideration there can be few or no meetings, but a cessation of hostilities is practically assured at an early date, certainly before our present session ends, and therefore, although there may for a long time be much to distract our attention, I hope that we may be able quickly to resume our monthly exhibitions, discussions and criticisms, and again to contribute our full share to "the promotion of knowledge in all that relates to obstetrics and gynæcology," which is the official description of the objects of our Section.

Treatment of Ante-natal and Post-natal Syphilis.[1]

By JOHN ADAMS, F.R.C.S.

(ABSTRACT.)

[This paper is printed *in extenso* in the *British Medical Journal*, November 16, p. 541.]

It is estimated that in England and Wales alone 27,000 deaths occur annually from syphilis contracted during the ante-natal period, or immediately after it. Evidence was given before the Royal Commission on Venereal Diseases that nearly 50 per cent. of all syphilitic fœtuses are stillborn, and that 75 per cent. of those born alive die within the first year of life, generally within the first week.

The following is a brief outline of the treatment which is adopted at the Thavies Inn Venereal Centre :—

(1) Ante-natal treatment of the unborn child, by means of antisyphilitic treatment of the mother.

(2) Post-natal treatment of the child immediately after birth.

The ante-natal treatment of the mother is of the utmost importance to the unborn child. The pregnant woman may be treated with one of the salvarsan substitutes and mercury with perfect safety up to the day of confinement, and the earlier the treatment is begun the better.

A Wassermann test should be made in every suspected case, and the treatment of the mother begun as soon as syphilis is diagnosed. This treatment consists of weekly intravenous injections of one of the salvarsan substitutes, galyl and novarsenobillon being those used, commencing with 20 cgm. galyl and increasing up to 30 cgm. Intramuscular injections of mercury, 1 gr., are given at the same time in the opposite buttock; the B.P. 40 per cent. emulsion has been the preparation used, it being less painful than the usual 5 per cent. emulsion.

Immediately on the birth of a child a specimen of the blood is taken from the vessels of the divided umbilical cord for a Wassermann test; a portion of the placenta is also obtained for examination for spirochætes. Further specimens of blood from the child are best obtained by pricking the heel with a medium size Hagedorn's needle in three or four places near one another, allowing about $\frac{1}{4}$ to $\frac{1}{2}$ c.c. of blood to drip in a 1 c.c. glass tube. This should be repeated, if necessary, at intervals of a month or six weeks for a further test.

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[1] At a meeting of the Section, held November 7, 1918.

Anti-syphilitic treatment of the baby is begun during the first week and may be commenced as early as the second day. It is almost impossible to give an intravenous injection to a new-born baby, but galyl in glucose is found to be an excellent preparation for intramuscular injections, and this is the preparation which has been invariably used. The dose is determined by comparing the weight of a baby with that of the mother. A newly-born baby is about one-seventeenth the weight of the mother; the average dose of galyl for an adult is 30 cgm. One-seventeenth of that quantity is about 2 cgm.; this should be gradually increased up to 5 cgm., or more as the child grows. The mercury is given at the same time in the opposite buttock in doses from $\frac{1}{4}$ to $\frac{1}{3}$ gr., and more recently in addition $\frac{1}{2}$ gr. of hyd. c. cret. is given daily by the mouth, when the child is two or three weeks old.

The site chosen for the intramuscular injections of salvarsan and mercury is the middle third of a line drawn from the anterior superior iliac spine to the commencement of the gluteal fold. It is advisable that there should be an interval of from a week to a fortnight before repeating the injection of galyl, but the mercury should be given weekly, unless it is decided to administer it by the mouth entirely; in that case $\frac{1}{2}$ gr. should be ordered once daily for the first fortnight, and afterwards the dose may be repeated night and morning.

Inunction is an excellent way of giving mercury to babies, but the results depend upon the preparation used, the time given to the rubbing, and the variations in the absorbing power of the skin. Moreover, to obtain the full effects of the inunction it is necessary that it should be given by someone experienced in the art.

It is found most convenient to give the intramuscular injections both of salvarsan and mercury, with a special syringe graduated in fifteen divisions, each of which is one-fortieth of a cubic centimetre. Thus each division of the syringe corresponds to 1 cgm. of mercury when 40 per cent. grey oil is used. The size of the needles found best adapted for the purpose of the injections is 0·8 mm.

The average number of doses of galyl required to bring about a negative Wassermann reaction was found to be 6·5, and the amount per case 26 cgm.

When possible the child should be fed by the breast, but after a few weeks it is generally found necessary to supplement the mother's feeding with artificial food, for the milk of a syphilitic mother is usually deficient both in quantity and quality. The weight of the baby should be carefully taken weekly, and it will be found almost invariably that there will be an increase.

Up to a recent date it was said that the Wassermann reactions of congenital syphilitic children never became negative under treatment. (Dr. Amand J. Routh, *Lancet*, January 12, 1918.) My investigations show this statement to be incorrect.

The results of the treatment as carried out at the Thavies Inn Venereal Centre for pregnant women has been very encouraging. Of twenty-four consecutive cases treated from September, 1917, to September, 1918, six babies have been born free from any evidence of syphilis, showing a negative Wassermann reaction which has remained negative; seven were born with a positive Wassermann reaction which became negative after treatment; in all these cases the babies' reaction became negative before the mothers'. Six babies born with a positive reaction remain under treatment and are doing well, show no signs of syphilis, and are gaining weight regularly.[1] In three cases the babies died *in utero*, the mothers having had no treatment before confinement; one child died from syphilis and one from some intercurrent disease. In no case did a baby once having become negative afterwards develop a positive Wassermann reaction: in one case the test has extended at three months' intervals over a period of a year.

The treatment described has been put to the test of experience sufficiently long to show that much can be done for ante-natal and post-natal syphilis, and the conclusions arrived at are:—

(1) Syphilitic pregnant women can be treated with salvarsan, even up to the day of their confinement, with safety and every advantage.

(2) A mother whose blood gives a positive Wassermann reaction may, after treatment, be delivered of a child whose blood gives a negative reaction. The child may continue to thrive and give a negative blood-test.

(3) Syphilitic children can be treated by salvarsan immediately after birth.

(4) Salvarsan, combined with treatment by mercury, has a more certain and quicker action in producing a negative Wassermann in a child than in the mother.

---

[1] January 1: The reaction has now become negative in all these cases.

(5) In nearly all syphilitic children born alive, treatment can soon convert a positive into a negative Wassermann reaction, and such children appear to become healthy and show a regular weekly gain in weight.

DISCUSSION.

Chairman—Dr. AMAND ROUTH.

Dr. AMAND ROUTH: Mr. John Adams has been successful in his practical efforts to treat and cure ante-natal syphilis. The mothers, who were all cases of primary and secondary syphilis, had not been long enough under treatment for a cure to be effected, and all but one of the twenty-four cases continued to have a positive Wassermann reaction. Of the children, eight of the twenty-four died, a mortality of 33 per cent., but five were stillborn (four macerated), and almost certainly had died before their mothers began treatment. Of the remaining sixteen children who survived four showed a negative reaction at birth, which remained so, whilst in three with reactions *strongly* positive, two positive, and two feebly positive at birth the reactions became negative. Mr. Adams's observations have not extended beyond ten months in any of the cases, so that his results are not final either as regards the Wassermann reactions or the clinical history of his patients, but he has shown that, contrary to accepted theories, 12 per cent. of the children born with strongly positive reactions became negative under treatment. He has also proved that new-born children whose mothers had been treated during the pregnancy were able to stand injections without risk. Of the sixteen children who survived fifteen received injections of galyl in glucose, and thirteen had also mercury in some form. These two facts, proved by Mr. Adams's statistics, are valuable. *Syphilis* during pregnancy destroys a greater percentage of fertilized ova than any other condition or cause, except perhaps at the very end of pregnancy, when "*accidents and complications of childbirth*" cause 25 per cent. of infantile deaths "*during or soon after birth.*" In Poor Law Hospitals over 16 per cent. of stillbirths are due to syphilis, and this percentage is doubled in illegitimate pregnancies. The astonishing thing is that the relatively large infecting *Spirochæta pallida*, with its enormous powers of multiplication, does not at once destroy the fertilized ovum. The explanation is that there is some condition present from the moment of conception until parturition, which to a large extent controls the situation, by directly or indirectly producing chemical ferments and their derivatives, which can render biologically inactive, and in some cases destroy, the infecting mature organism. The chorionic ferments fulfil this chemical function, and at the same time saturate the blood of the mother with antibodies which are able usually to prevent spirochætes from further developing in her own body during pregnancy. As soon as childbirth is over, both mother and child get gradually freed from chorionic chemical influences, and syphilis may develop either rapidly or slowly in both in untreated cases. The chorionic ferments in the mother are probably accumulative in successive pregnancies, and this explains how it is that syphilitic mothers at first suffer miscarriages with dead children, then have stillbirths, then diseased children dying in early infancy, and eventually may have children showing no signs of disease, some of whom may become general paralytics at puberty or in early adolescence. It also explains an opinion formed by J. E. R. McDonagh that "in some cases repeated pregnancies have undoubtedly resulted in a spontaneous cure of the disease." There seems very little doubt that the chorionic ferments control the growth of spirochætes by granulosing them—i.e., breaking them up into granules by transverse division of the spirals. Professor Noguchi, working in the Rockefeller Institute, U.S.A., has described (in the April, 1917, number of the *American Journal of Syphilis*), how he began to take cultures from such granules in 1910-11, and succeeded in growing the mature spirochæte. He has continued to make a series of cultures from granules derived from his different generations of spirochætes till the date of his article (1917), and he has been able by means of these various generations of spirochætes, spread over seven years, to infect rabbits and monkeys with true syphilis. It is easy therefore to understand that the chorionic ferments can in many cases control the syphilitic infection by granulosing the spirals of the mature spirochæte, and if the granules are not destroyed would continue to render them biologically inactive, or would be able to destroy any developmental buds, and so keep the mature spirochæte from becoming generalized in the tissues during pregnancy. Nature therefore is doing much to protect the fœtus *in utero* from its conception to its birth, and the obstetric physician must come in, as Mr. John Adams has done, to supplement the action of the chorionic ferments by giving the mothers salvarsan and mercury during the pregnancy, and continuing the treatment to both mother and child after parturition.

Dr. GRIFFITH: I am responsible for having asked Mr. Adams to read his paper before the Section, because I felt sure that the sooner the subject was brought forward for discussion, the sooner would the value of the treatment be determined, and the criticism which Mr. Adams has invited be forthcoming. The treatment appears to me to be of great promise, but it is obviously too early to draw final conclusions.

Mr. W. G. SPENCER: Mr. Adams and the City of London Authorities have taken two important steps—the City of London in providing in-patient treatment for venereal cases, and Mr. Adams in combining an early intensive salvarsan and mercury treatment and applying this to new-born infants. The salvarsan has the drawback that, whilst rapidly removing the manifestations of syphilis, it does not cure. Out-patients are in consequence liable to neglect the real curative treatment by mercury. It is dangerous to carry out such an intensive combination of the salvarsan and mercury treatment among out-patients. For such a procedure patients must be prepared, thoroughly examined and watched afterwards. If the authorities of London as a whole really aim at diminishing the severity of venereal disease among those already infected, they must follow the lead of the City, and provide in-patient accommodation. When the main effect of the disease has been arrested by an intensive salvarsan and mercury course whilst the case is an in-patient, treatment as an out-patient may then be continued indefinitely.

Dr. HANDFIELD-JONES: The difficulty in discussing the paper is that so few have enough cases of acute syphilis to be able usefully to criticize the results and conclusions. But if one has cases where the disease has been manifested before the sixth month, and the mother's condition has been satisfactory afterwards, and the child is healthy, there is reason to suppose that the child will remain so. I have watched such a case until the age of 12 years, and the child has remained perfectly free from syphilis.

Mr. W. GIRLING BALL: It is difficult for me to criticize Mr. Adams's paper, first, because I have not had an opportunity of examining this record of cases with which he has provided us in any critical manner in the short time at our disposal, and also because I fear that he will not be so inclined to take cases from me which present themselves at St. Bartholomew's Hospital in the same way as he has done in the past. At the same time there are one or two points which force themselves upon one's attention. Mr. Adams has told us that he does not admit his cases to his institution before the patient has advanced into the sixth month of pregnancy, at a time when syphilis is well developed in the mother and no doubt also in the child. Some of these patients have had treatment before the birth of the child, and few of them before admission to hospital. It seems a curious fact that in those cases which have been treated by salvarsan substitute and mercury—even with several doses—in no case was a negative Wassermann reaction obtained before the birth of the child. Surely this should be an important position to arrive at, if possible, before the birth takes place, for no doubt if such a condition is arrived at in the mother the drugs must also have some effect on the child and thus render it a more desirable subject for post-natal treatment. With some considerable experience in the treatment of syphilis it is no uncommon experience for me to obtain a negative Wassermann reaction with a single course of six doses of salvarsan substitute with six mercurial injections, in fact, it is the almost invariable rule with cases of primary syphilis. A second course almost always abolishes the reaction, even with those having advanced secondary conditions. A few cases do not get this result, of course. In none of these mothers has a negative reaction been obtained, from which I argue that the treatment of the disease is not commenced soon enough and that the mothers ought to be admitted for treatment at an earlier stage. As Mr. Adams points out, this is not possible with so small a number of beds available. We shall never do any good in the treatment of congenital syphilis until a large number of beds are provided for this form of treatment. The Corporation of the City of London is to be congratulated in having started, but it remains for the profession to urge that this plan should be adopted on a much larger scale, if they are to tackle what is the bed-rock of the trouble. With regard to the remark that he has had harmful results from the use of novarsenobillon, I can only tell Mr. Adams that during the past year I have had no trouble at all with it. I have seen some few cases treated by others and believe that in those the harm has been produced by the use of too large doses. I should like to hear more of the results later.

Dr. W. H. KELSON: I consider that Mr. Adams's treatment has been very successful so far as it goes, but it is extremely important that this batch of cases be followed up in respect to both mothers and infants. I hope their social position is not such as to preclude this. It is a very difficult thing to say when syphilis is actually cured.

Dr. A. E. STANSFELD: I carried out the Wassermann tests in Mr. Adams's cases, and it does not appear quite fair to these results to take the percentage of deaths as a criterion. Cases of syphilis vary very much in their response to treatment, and that fact is well demonstrated in this particular paper. Three of the children with strong positive reactions at birth subsequently, in the course of two or three months, developed negative reactions which remained negative. I am struck by the extremely short time which has elapsed in these three cases for the change from the positive to the negative reaction to take place. In older children with strongly positive Wassermann reactions, the reactions never become negative in anything like that time. Once a strongly positive Wassermann reaction has been made negative there is every hope that continuation of treatment will render it persistently negative. So that even if Mr. Adams has only these three cases to show he has made out a strong case for the treatment after birth.

Mr. ADAMS (in reply): The taking of the test while the patient is under treatment makes no difference in these cases. The positive remains positive, and the negative remains negative. The question has been asked as to what happens to these women in their next confinement. I am well aware that observations extending only over a year are not sufficient for me to elaborate anything like a perfect system of treatment, but a good many of my friends have urged me to bring the cases at their present stage before the Section. Mr. Girling Ball has raised a very pertinent question by speaking of the early treatment in the case of the mothers. One cannot treat any case too soon. In the early stages of primary syphilis we can, if the case is brought under treatment early enough, so deal with it as scarcely to see any secondaries at all. I am accustomed to wait for my reports before I begin any treatment; now if a woman has a positive reaction the baby is treated at once. I look upon the seven cured cases very hopefully (cases which had a strongly positive or positive reaction at birth and have come to have a negative reaction later), and I should be very disappointed in the future if a child born alive dies from syphilis. Through the generosity of the City Authorities, I have been enabled to have these cases looked up after their removal from the hospital; a visitor is appointed to keep in touch with them. What impresses me most is this, that the scientific and theoretical treatment of syphilis by salvarsan and mercury is followed by the clinical results, that the child does not die, that the test may become negative, and that the child may grow fat and look well. If we cannot get science and practice to go together we do not get very far, but in this case they do go absolutely together. Dr. Kelson has asked what kind of persons the mothers are. They are of all sorts and conditions, married and single. The great thing is to have them under one's control. I demur to Dr. Routh's deductions with regard to the mortality rate in my list of cases. The mortality of syphilitic children—of those born alive—is 75 per cent. Of these twenty-four cases, nineteen were born alive, four children died *in utero* before the mothers received any treatment and one child, a six and a half months' baby, died a few hours after birth; of these nineteen, 75 per cent. should have died within the first year, mostly in the first few weeks, but as a matter of fact out of the whole of the nineteen cases born alive only two have died, and one of these did not die of syphilis. All the babies born alive regularly put on weight except one baby that died thirty-five days after birth, and from this it would seem that if these children should develop syphilis later on they would at least have a chance under treatment.

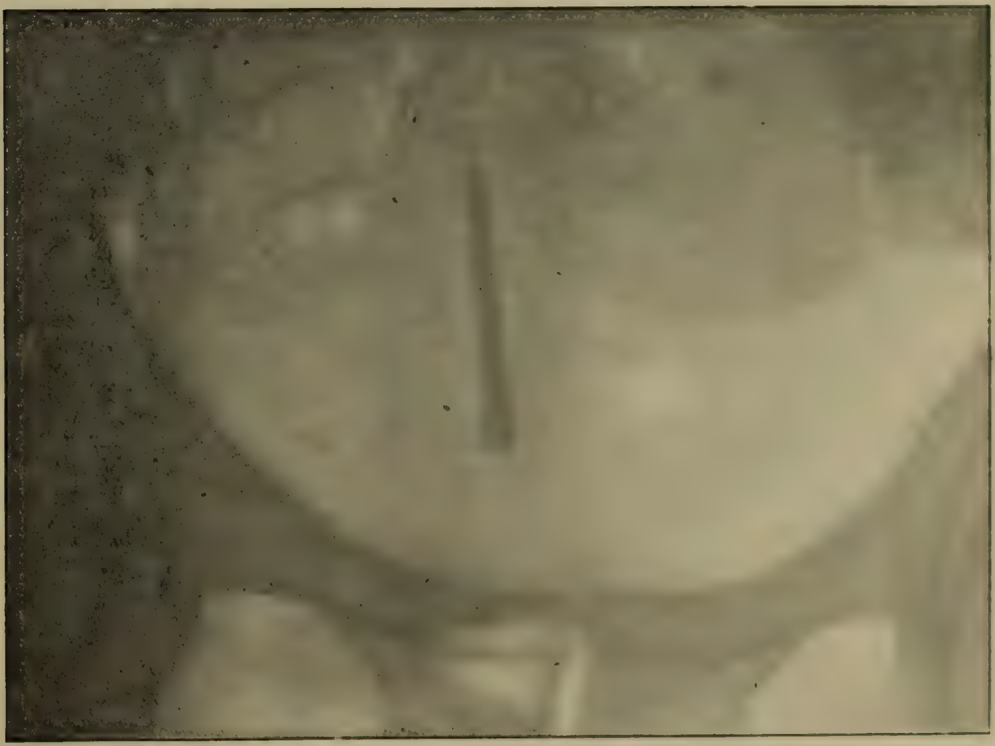
Section of Obstetrics and Gynæcology.

President—Mr. J. D. Malcolm, F.R.C.S.Ed.

Skiagram of Foreign Body in the Gravid Uterus.[1]

Exhibited by G. Drummond Robinson, M.D.

An unmarried woman was admitted to Westminster Hospital with the history that in the belief that she was pregnant, she had tried to pass a crochet needle, the hook end of which was covered by a metal



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[1] At a meeting of the Section, held December 5, 1918.

cap, into her uterus *per vaginam.* On withdrawing the crochet needle she was alarmed to find that the cap had not come away with it. She had hæmorrhage from the vagina, and, becoming frightened, came to the hospital. On examination the uterus was found to be bulky; the os uteri was slightly patulous; no part of the metal needle cap could be felt. Dr. Worrall then took several X-ray photographs, in one of which the metal cap of the crochet needle is very clearly seen (p. 17). As no similar case has been recorded in this Section of the Society, so far as I am aware, it seemed to me that the skiagrams would be of interest to the Fellows. Shortly after the skiagrams were taken, the patient passed an ovum of about two months, together with the metal cap, spontaneously, during an action of the bowels. The metal cap measures $2\frac{1}{10}$ in. in length.

Dr. AMAND ROUTH: I once removed a hollow glass stem pessary from which the glass knob had been broken off, by splitting up the cervix and uterus anteriorly after turning up the bladder.

A Uterus in which Changes had taken place as the Result of Procidentia.

By G. DRUMMOND ROBINSON, M.D.

N. G., AGED 46, had complete procidentia of the uterus in 1900 (eighteen years ago), after the birth of her second child. In 1901 (seventeen years ago) hysteropexy was performed on her at the Soho Hospital for Women. In 1902 (sixteen years ago) the patient was confined at Queen Charlotte's Hospital of her third child. Shortly after this confinement the prolapse reappeared.

In 1903 (fifteen years ago) I first saw the patient. The vagina was completely prolapsed; the sound passed 8 in. The supravaginal portion of the cervix could be felt through the vaginal walls, much elongated and very thin. The fundus uteri appeared to be attached to the anterior abdominal wall. I performed an extensive perineal operation, which enabled the patient to retain a pessary. Within a year of this operation the uterine canal had become so shortened that the sound only passed $3\frac{1}{2}$ in. There has been no further pregnancy.

Recently the patient had hæmorrhage from the vagina, and on December 1, 1917, I removed the uterus by Wertheim's method for carcinoma of the cervix. The fundus uteri was found firmly attached to the anterior abdominal wall. Immediately after operation the sound passed through the external os 4½ in. into the uterus. The body of the uterus appeared to be enlarged. The patient has made an uneventful recovery.

I show the specimen. The carcinoma of the cervix is seen, but the interest of the case centres in the history of the supravaginal cervix. It has long been known that when the cervix protrudes from the vulva in cases of so-called prolapse of the uterus there is usually an increase in the length of the supravaginal cervix. Whether this elongation of the supravaginal cervix is due to stretching of that structure alone or to new growth of its tissues, or to both conditions, has been discussed from time to time. In the present case when the patient was first seen by me in 1903, the sound passed the enormous distance of 8 in. into the body of the uterus, and the end of it could be felt at the fundus at the lower end of the abdominal scar. Within a year from the time the uterus had been kept in place by a pessary this length had decreased by 4½ in. Presumably the supravaginal cervix had been elongated at least to that extent by the prolapse and had shortened again to that same extent after the uterus had been supported in its normal position for a few months.

So far as I am aware no specimen of a uterus and cervix in which the changes I have described in the supravaginal cervix have been carefully watched clinically has ever been shown before our Section, or its predecessor the late Obstetrical Society. The specimen shows the area of attachment of the body of the uterus to the abdominal wall.

REMARKS.

(1) Whatever be the nature of the elongation of the supravaginal cervix in cases of procidentia, this case proves that it may disappear to the extent of 4½ in. after the uterus has been replaced even when the procidentia (and presumably the elongation of the supravaginal cervix) have lasted for as long as three years.

The fact that this elongation comes quickly in cases of procidentia, —as I think we have all experienced—and may disappear rapidly, as in this case, when the procidentia is relieved, compels me to the view that such elongations may be, and probably always are, at first entirely due to mechanical stretching of the cervical tissues.

Whether this elongation becomes permanent upon the development of a new growth of tissue after a longer or shorter time I do not know. In my case such new growth was certainly not in evidence to any appreciable extent after a lapse of three years.

(2) Ventrifixation (for prolapse) without support of the vagina by some means from below is insufficient for the relief of a really bad case of prolapse.

It must be the experience of all of us to have seen many cases similar to this one (I myself have seen a large number) in which complete procidentia occurred within a few months of ventrifixation.

REPORT ON SPECIMEN BY DR. BRAXTON HICKS, PATHOLOGIST TO WESTMINSTER HOSPITAL.

The case first came under my notice in December, 1917, when a portion of the cervix was sent up for histological examination to the laboratory. It proved to be a carcinoma, the cells of the growth varying considerably in size and shape, and tending to be arranged in masses and columns. It had the appearance of a squamous carcinoma of the vaginal cervix, these variations in appearance from that of typical squamous carcinoma elsewhere being well known.

The entire uterus and adnexa came under my notice later when removed by my colleague Dr. Drummond Robinson. When freshly removed from the body the sound passed 4½ in., but after hardening in formalin with its consequent shrinkage, the sound passed 4 in. only. After making a section through the uterus, the actual cavity is found to measure 1¾ in., and the cervical canal (i.e., internal to external os) 2¼ in. As can be well seen on examination of the hardened specimen, the cervix and cervical canal are invaded extensively with growth, which makes demarcation of uterine cavity from cervical canal difficult to determine with accuracy, though the rough limits are readily seen.

The after-history of this case should be interesting, as the general appearance of the growth under the microscope and its extent as seen in the anatomical specimen lead me to suspect an eventual recurrence, in spite of the extensive and temporarily successful Wertheim operation.

DISCUSSION.

Dr. W. S. A. GRIFFITH: I cannot understand why some authorities deny the existence of tensile elongation of the supravaginal cervix, the commonest and almost invariable condition present where the cervix is found protruding from the vulva, and so easily demonstrable by measuring the length of the uterus before and immediately after replacement. It is equally true that hyperplasia of this portion does occur in some cases, and in others neither stretching nor hyperplasia. An essential condition for the stretching of this very tough cervix is the resistance to the descent of the body of the uterus, the least supported portion of the uterus; for this I can offer no explanation, other than what was described as the "retentive power of the abdomen" by Matthews Duncan, but this seems quite inadequate in so many cases where the abdominal walls are flaccid. I have long given up hysteropexy for this condition: the support by repair of the pelvic fascia in the anterior and posterior vaginal walls is essential.

Dr. FAIRBAIRN: The chief interest in this specimen centres in its showing no permanent elongation of the cervix after prolapse of many years' standing. This should suggest that the common practice of amputating enough cervix to bring the uterine canal to somewhere near its normal length, usually performed as part of the operative treatment of prolapse, may often be unnecessary. If marked elongation is present at the time of operation the cervix cannot be got into a satisfactory position without removal of some of the hypertrophied canal; hence, even if the elongation is temporary, amputation will be required in those cases in which it has not disappeared by the time the operation is done.

Dr. AMAND ROUTH: I believe that the supravaginal elongation of the cervix is due to traction of the prolapsed vaginal walls whilst the uterus is in normal position. This elongation in early cases is stretching only, but it leads to thickening in some of the chronic cases. I have found amputation of about 3 in. of the cervix with removal of some vaginal tissue, and the temporary use of a ring pessary, usually sufficient to cure, though partial recurrences are apt to take place.

Dr. LAPTHORN SMITH: Like most operators I have seen many cases of enormous hypertrophy of the cervix. At first I used to remove all the surplus length in excess of 2½ in., but later I found that this was not necessary, and that if 3 in. or even 3¼ in. of uterus were left, a process of involution occurred, and in a few months the small surplus was found to have been absorbed. I attribute this to the improvement in the circulation following the operation, as I believe that the hypertrophy is due in the first place to defective circulation. In women who have had bad confinements, which have formed the bulk of my cases of hypertrophy of the cervix, which in some instances has been enormous, the process I believe has begun with a tear of the cervix and perineum, followed by subinvolution, retroversion, prolapse, rectocele and cystocele; and in these cases my invariable practice has been amputation of 3 in. or 4 in. of the cervix, anterior and posterior colporrhaphy, making sure to bring the separated levator ani muscles together, and then a ventrifixation. The results of these combined operations at one sitting have been eminently satisfactory. If the woman is still of a child-bearing age I prefer a round ligament operation, as with a restored perineal floor and a lightened uterus, such operations are especially successful.

Dr. HERBERT WILLIAMSON: There can be little doubt that elongation of the supravaginal cervix may be due either to stretching or to tissue formation. I have been in the habit of demonstrating to students the stretching of the supravaginal cervix in cases of prolapse of the second degree, by measuring the uterine cavity when the uterus was down, then replacing it and measuring the cavity again; 1½ in. to 2½ in. difference in the two measurements is usually found. There are on the other hand cases in which the elongation is permanent and not due to stretching; there is a specimen in St. Bartholomew's Hospital Museum of a uterus with a supravaginal cervix measuring 3½ in. in length. It is probable that in the early stages the elongation is entirely due to stretching, but that in the later stages in some instances the elongation becomes permanent. Dr. Lapthorn Smith appears to be confusing two different conditions. The cases he describes in nulliparæ are evidently cases of elongation of the vaginal portion of the cervix—a congenital condition, and not the result of prolapse.

A Short Communication on a Case of Labour in a Paraplegic Woman.

By G. DRUMMOND ROBINSON, M.D.

IN 1897 Dr. Amand Routh read a paper before the Obstetrical Society in which he recorded a case of labour in a woman suffering from paraplegia. He also gave notes on all the cases of a similar nature, seven in number, which had been recorded in medical literature and discussed the whole subject in a very exhaustive and able manner.

In 1909 a case of this sort came under my own care. I had intended to record it at the time but I thought it would be more satisfactory to wait until I could get an opportunity of verifying the cause of the paraplegia by a post-mortem examination. Unfortunately whilst waiting, through inadvertence, the matter slipped my memory, and only recently has it been again brought to my mind. The case is as follows:—

L. D., aged 31, seven children, one miscarriage, was admitted to Westminster Hospital, on August 21, 1909, under the care of Dr. R. G. Hebb, with the following history: On the night of August 13 the patient woke up with acute aching pain in the back, chest and legs. She could not lie down but sat and dozed in a chair. To be on her feet was the least painful position; bending forward of the head caused great pain. This pain continued until August 19 when numbness occurred in the legs, back and abdomen and the patient found that she could not move her legs. At the time of admission, August 21, it was stated that she had not passed water for three days and a distended bladder was emptied by catheter. The bowels had not acted for some days. There were two bed-sores, one just behind the anus, the other over the sacrum. There was complete paralysis of the lower limbs with loss of sensation up to the level of the umbilicus in front, and of the twelfth dorsal spine behind. Immediately above this level there was a zone 1½ in. broad of diminished sensibility. There were no reflexes in the legs or abdomen. There was no reaction to faradism or galvanism in the legs. There was pain and tenderness in the back, especially in the region of the tenth dorsal spine. There was a foul vaginal discharge. Incontinence both of urine and fæces occurred soon after admission. The urine was offensive and alkaline and contained the *Bacillus coli*, a Gram-negative coccus and a Gram-positive strepto-bacillus.

Dr. Hebb diagnosed complete transverse myelitis in the dorsal region.

On inquiry it was found that the patient's last menstrual period had ceased on July 2. On October 15 the following note was made: "*Per abdomen* an elastic mass, presumably the gravid uterus, can be felt. It extends about 2 in. above the symphysis pubis. Bimanually, the abdominal mass is found to be the body of the uterus presenting the characters of a pregnancy of about the third month."

The case was then transferred to my ward.

During the following weeks the patient's general condition was unsatisfactory. There were many rises of temperature—up to 103° F., and there were two attacks of congestion of the lungs, one in September and the other in December. The urine was offensive in spite of repeated irrigation of the bladder. There was inflammation of the gums. The bedsores remained unhealed.

On December 17 the patient declared that she had quickened and from that time onwards she thought that she could feel the fœtal movements. At no time could the fœtal heart be heard or the fœtal movements felt *per abdomen*. When the fundus uteri had reached the level of the umbilicus it seemed to stop growing and as no sign of fœtal life could be detected I thought that the fœtus had died. However the woman stoutly maintained that she could feel the fœtal movements. Careful measurements were taken and after a time it was ascertained that without doubt the uterus was still increasing in size, though at a very slow rate. (At the end of the pregnancy the distance of the fundus uteri above the symphysis pubis was 12 in., and the whole uterus was considerably smaller than usual.)

On March 20 contractions of the uterus were first noticed during palpation. At 4.30 a.m. on April 10, 281 days from the last menstrual period, the nurse was going to dress the bed-sores when she noticed a blood-stained discharge from the vagina. Well marked uterine contractions could be felt *per abdomen* coming every two minutes. At 8.10 a.m. (that is three hours and forty minutes after the first sign of labour was noticed) a living female child, weighing 5 lb. 13½ oz. L.O.A. was spontaneously delivered. During some of the uterine contractions the patient experienced a "very slight niggling pain," but such a sensation was very occasional and otherwise the labour was entirely painless. The placenta was expelled spontaneously at 8.35 a.m. No vaginal examinations were made. The involution of the uterus was normal. Abundant milk was secreted but it was unsatisfactory in quality and as the child rapidly lost weight it was weaned and put on a diet of cow's milk on which it did excellently. After delivery the bed-sores gradually healed.

Strong pressure was brought to bear on the patient to get her to remain in the ward for incurables which we have in the hospital. Unfortunately she refused and discharged herself. I kept in touch with her for some months and then found that she had suddenly become much worse and had been taken to an infirmary, where she died shortly after admission. Unfortunately no post-mortem examination was made, and I did not know of the patient's death until some weeks after it had occurred. The child was alive a year after its birth.

In the above case, as in that recorded by Dr. Routh, there were bed-sores, cystitis and congestion of the lungs together with irregular rises of temperature. Unlike Dr. Routh's case no long hair developed over the anæsthetic area of the body, and the uterine contractions, relaxations, and retraction were quite normal.

One striking feature of the case was the exceedingly slow rate of growth of the uterus after the fifth month and its small size at the full term. The normal gravid uterus is said to grow at the rate of 3·5 cm. (1 in. = 2·54 cm.) every four weeks after the fifth month. The growth in this case was nothing like so rapid as this. In fact it was so slow that I thought at one time the fœtus was dead, especially as neither fœtal heart sounds nor movements could be detected. At the end of pregnancy the uterus had the general appearance and size of one only at the end of the seventh mouth. The fundus extended to halfway between the umbilicus and the ensiform cartilage, and measured 12 in. from the symphysis. At the end of the seventh month of a normal pregnancy the fundus usually measures 12 in. from the symphysis, and at the full term a uterus that measures 15 in. is not unusually large. This clinical feature has not been noted in any of the other recorded cases.

I have already mentioned that Dr. Routh gives records of seven other cases besides his own, the latest recorded having occurred in 1874. Since his paper was read twenty years ago no other case has been recorded. I do not propose again to raise the many points so ably discussed by Dr. Routh in his most interesting paper and I would refer Fellows of the Society to the Obstetrical Society's *Transactions* for 1897 (vol. xxxix, pp. 191-227). It would however be of interest for me to quote his conclusions (p. 220) :—

> "The above cases and experiments seem to show that in women affected with paraplegia, from either injury or disease in the dorsal region of the spinal cord, labour may commence at the normal period of gestation, and may progress in an approximately normal manner, but without sensation of pain.
>
> Involution and lactation are also normal.
>
> It is proved also from both cases and experiments that conception may take place during paraplegia.
>
> Further experiments, as well as clinical facts, are required before the physiology of parturition can be known, and much will be done when it is discovered with certainty what is the force by which the process of labour is initiated at the end of gestation.
>
> Meanwhile the following views seem to be fairly established :—
>
> (1) The act of parturition is partly automatic and partly reflex, these actions corresponding in the main to the first and second stages of labour respectively.
>
> (2) Direct communication with the brain is not essential to co-ordinate uterine action, though the brain seems to have a controlling influence upon the pains, helping to make them regular, with well defined intermissions.
>
> (3) Direct communication between the uterus and the lumbar enlargement of the cord, through the medium of the sympathetic ganglia between the first and third lumbar, is probably essential to the regular and co-ordinate contraction and retraction of the uterus, as occurs in normal parturition.

(4) It seems also probable that the uterus is able automatically to expel its contents as far as the relaxed part of the genital canal, even when deprived absolutely of spinal influence, spinal reflexes being then necessarily absent. But in the absence of reflex action the entire parturition would be irregularly, and probably incompletely, performed.

(5) Lactation is not solely due to nervous influence, but partly to chemical changes in the blood, affecting secondarily the mammary glands and other tissues of the body. This chemical change in the blood is not of ovarian origin, but is probably due to the metăbolism of the pregnant uterus."

In the discussion which followed the reading of Dr. Routh's paper the interest chiefly centred round the nature of the physiological stimulus that excites the uterus to expel its contents at the full term. Dr. Mott suggested that this "physiological stimulus" to labour might be a biochemical condition of the blood of the fœtus at full term. The trend of all recent work seems to be in this direction. The importance of "internal secretions" in certain physiological processes is being more and more recognized. In the recent editions of all the principal works on physiology the view is expressed that the physiological stimulus to labour is the result of the action of some chemical substance or substances produced probably in some part of the reproductive system (ovary, placenta, fœtus, &c.) and conveyed direct to the uterine muscle by the blood stream.

DISCUSSION.

Dr. AMAND ROUTH: With reference to my case of parturition during paraplegia, which I described in the *Transactions of the Obstetrical Society of London* in 1897, fracture and displacement had occurred between the fourth and fifth dorsal vertebræ when the patient was seven months pregnant. Labour occurred at nearly full term without sense of pain, and with rapidly recurring strong "pains" throughout. These cases point to a biochemical cause both of the onset of labour and of lactation, which may each be due to different changes in the chemical constitution of the chorionic ferments or the resulting syncytiolysins. The onset of labour is probably due to the influence of the altered chemical contents of the blood stream upon both the lumbar enlargement of the spinal cord and the uterine muscle.

Dr. DRUMMOND ROBINSON (in reply): So far as I am aware no experimental work has been done on the "physiological stimulus" which is the cause of labour, but Professor Starling and Miss Lane-Claypon have made some interesting observations on the function of lactation. These observers found that the injection of an extract made from fœtal rabbits into a virgin rabbit produced changes in the mammary glands similar to those which result from pregnancy. They conclude that in rabbits the function of lactation is the result of the stimulation of some chemical substance or substances contained in the fœtus. Foà has confirmed these observations. I am interested in learning that in France a number of confinements have taken place normally and painlessly under spinal anæsthesia. I have myself performed a Cæsarean section under spinal anæsthesia, and in that case the contraction and retraction of the uterus were quite normal.

Two Cases of Puerperal Anuria in which the Renal Capsule was incised and Portions of the Kidney Substance removed for Examination.

By CLIFFORD WHITE, F.R.C.S.

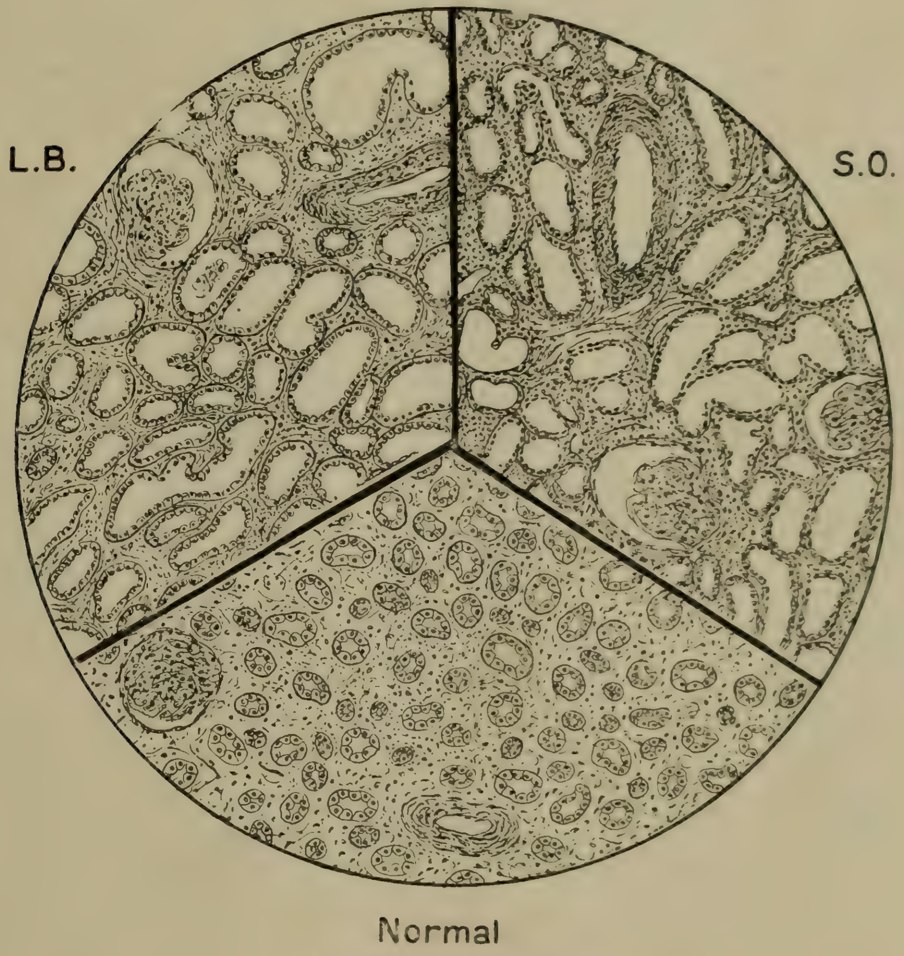
THE sections of the kidney which I am showing to-night were both removed by operation from patients suffering from partial anuria during the puerperium. As their appearance is unusual and may have a bearing on the causation of the suppression of urine, I shall be interested to know if members of the Section have met with similar conditions of the kidney. The clinical histories of the cases are briefly as follows:—

L. B. The patient was a primigravida admitted to Queen Charlotte's Hospital on April 7, 1918, comatose from eclampsia at the twenty-fourth week of pregnancy. She was distinctly cyanosed and faintly jaundiced. The blood-pressure was 160 mm., there was slight œdema of the ankles and free fluid was present in the peritoneal cavity. Catheterization yielded but an ounce of dark bloody urine. Fits recurred at short intervals. She was delivered of a dead child by abdominal Cæsarean section and when the kidney was directly palpated at the end of the operation, it was found to be very hard. As recorded in detail in the *British Medical Journal* of July 6, 1918, it has been my custom to open the fibrous capsule of the kidney when performing Cæsarean section on eclamptic patients who are passing very little water if, on direct palpation, the tension of the kidney is greater than usual. This has been done on the supposition that the increased tension inside the fibrous capsule of the kidney is a factor in causation of a diminished flow of urine by producing pressure on the collecting tubules. However, owing to the early period of the pregnancy in this patient, the Cæsarean incision was too low to permit of the kidney being reached without extending the incision, and this was considered unadvisable owing to the critical condition of the patient. After the operation no further fits occurred and consciousness was regained in two hours. From April 8 to April 17, although large quantities of fluid were administered, there was almost complete suppression of urine. There were, however, none of the usual symptoms of uræmia; the patient was conscious although inclined to be drowsy, but vomiting, convulsions, headache, twitchings and delirium were absent. The tongue was clean, the breath not offensive and the optic disks normal. On April 17 her general condition was much worse and the œdema rapidly increasing, so I incised the right loin and exposed the kidney, which was dark purple in colour and hard. On incising the fibrous capsule of the kidney, the renal substance bulged slightly through the cut: a minute piece of the kidney was removed for microscopic examination. In the sixteen hours before the operation she had passed only 2 oz. of urine, in the next eight hours she passed 6 oz. *per urethram* besides a quantity that escaped through the drain in the loin. The next day (April 18) 38 oz. were passed, on the 19th, 37 oz., and on the 20th, 50 oz. Casts were absent till the day after the operation, when blood and leucocytic casts were passed in quantity. The patient rapidly convalesced and was discharged in good condition.

The other case is that of S. O., who was admitted to University College Hospital under Dr. G. F. Blacker, on March 12, 1912, being then at the sixth month of her second pregnancy. She had had severe albuminuria for several weeks and although labour was induced on April 1, the albuminuria did not improve and œdema became intense and universal. In spite of treatment never more than 9½ oz. of urine were passed in each twenty-four hours and on April 17 four fits occurred and the patient seemed to be dying. On the 18th nephrotomy was performed. In this case the kidney did not bulge much through the capsule but she started passing 20 oz. of urine a day and rapidly recovered.

The sections from both cases are very similar. In both there is well-marked dilatation of the tubules; the extent of this dilatation can be seen in the tracings made from the actual sections shown to-night compared with a tracing made from a section of a normal kidney (see fig., p. 29). The cells lining the tubules are more or less degenerate and some tubules are filled with granular material. The glomerular cells show little change but the clear space round them is greater than in a normal kidney. There is small-cell infiltration of the interstitial tissue and the connective tissue is, in places, increased in amount and is œdematous. No thrombosis of vessels is present.

The question of importance is, what is the causation of the diminution in the quantity of urine excreted in these cases? Anuria in the puerperium is a well known although uncommon event and, following the publication of Bradford's and Lawrence's post-mortem findings in 1898,[1] it has been usual to ascribe it to thrombosis of the intertubular vessels with necrosis of the renal cortex. Rolleston[2] collected eleven fatal cases recorded with post-mortem findings. In these cases the clinical



To show appearance of section of normal kidney compared with sections from the patients L. B. and S. O. The illustration is made up from tracings from the microscopic sections, and gives an accurate comparison of the sizes of the renal tubules and glomeruli.

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[1] *Journ. Path. and Bact.*, 1898, v, pp. 195-201.

[2] *Lancet,* October 25, 1913, p. 1173.

symptoms are similar to those present in the case of L. B., i.e., similar to the symptoms which occur when both ureters are blocked by calculi, and to which the name " latent anuria " is given. As far as I am aware the " thrombotic kidney " theory rests on post-mortem findings, as the condition of the kidney during life has not been investigated, nor have minute portions removed by operation been submitted to microscopic examination.

The possibility that inflammatory swelling producing increased tension within the fibrous capsule of the kidney may be a factor in causing a diminution in the flow of urine is supported by clinical observation. Direct palpation of the kidneys during Cæsarean section for eclampsia has shown them to be harder than normal in some half dozen of my patients in whom the urinary output was distinctly diminished. Whereas it was interesting to find the kidney comparatively soft on palpation in two recent cases in which large quantities of urine were being passed. In both these cases the patients were profoundly toxæmic, but plenty of urine (in one case 12 oz.) was obtained by catheterization immediately before operation, and free diuresis continued after delivery by simple Cæsarean section. The immediate passage of leucocytic casts after incision of the capsule, although they had been absent previously (in the case of L. B.), is also suggestive.

The sections shown to-night seem to support the view that the deficient excretion of urine is due to obstruction to the flow from the renal tubules; thus the tubules become overdistended and dilate. When the pressure of urine in the tubules becomes sufficiently high, secretion ceases or re-absorption commences. Experimentally, when the ureters are ligatured in animals, the pressure of urine in the manometer rises to 60 mm. Hg. and then stops, thus showing that a comparatively low pressure is enough to prevent further excretion.

I suggest that the thrombosis and cortical necrosis found post-mortem in these cases are terminal phenomena, and not the actual cause of the suppression during life. The immediate improvement following the relief of tension inside the fibrous capsule of the kidney suggests that the increased tension is the immediate cause of the diminished urinary output, and, if so, the condition instead of being necessarily fatal, is amenable to surgical treatment.

The small number of the cases that I have so far investigated makes it impossible to draw any definite conclusions, but I bring forward these observations in the hope that members of the Section will be able to confirm or contradict them as a result of further experience.

DISCUSSION.

Dr. FAIRBAIRN: As far as I can remember the cases described by Lawrence and Bradford and by Rolleston are not really on all fours with these eclamptic anurias of Mr. Clifford White's two cases. My impression is that the characteristic clinical features of these cases consisted in the anuria being unaccompanied by fits or by uræmic symptoms; indeed, until near their fatal termination there were very few symptoms of any kind. The effect of the anuria was compared to that produced by ligature of the ureters in animals or double calculous anuria in the human being. The post-mortem changes were those of an extreme necrosis of the renal cortex, while the pyramids remained unaffected. Lawrence and Bradford ascribed this to an obliterative endarteritis, but surely the primary cause is now recognized as a toxic one which picks out the cortical area. How could increased tension within the capsule explain the very selective character of the necrosis in these cases? I have seen two cases of this kind, and the striking feature in both was the marked differentiation of the necrosed cortex from the unaffected pyramids.

Mr. CLIFFORD WHITE (in reply): Regarding Dr. Fairbairn's criticism that one of the two cases was clinically unlike the typical case with necrosis of the cortex found post-mortem, in that uræmic manifestations were present, I would point out that Rolleston states that "analysis of the eleven collected cases does not justify the statement sometimes made that uræmia is constantly and entirely absent." I suggest that further knowledge may indicate that the vascular changes found post-mortem are terminal phenomena, and not the primary cause of the symptoms that come on some ten days before death. If the cause be toxæmia, increased diuresis, however obtained, will aid in eliminating the toxin.

Section of Obstetrics and Gynæcology.

President—Mr. J. D. MALCOLM, F.R.C.S.Ed.

DISCUSSION ON RECONSTRUCTION IN THE TEACHING OF OBSTETRICS AND GYNÆCOLOGY TO MEDICAL STUDENTS.[1]

A General Survey of the Subjects to be taught and of the Methods of teaching them.

By W. S. A. GRIFFITH, M.D.

THE importance of a thorough training in obstetrics for students of medicine, who with few exceptions will enter general practice, is generally accepted : my duty this evening is to introduce a discussion on this subject in order that we who have the great responsibility of teaching may consider our aims and methods, so to ensure that our training shall be as perfect as possible and our students made capable of rendering the great service to the nation that the efficient care of mother and infant can afford.

We who are teachers can help each other by comparing our methods; those who have profited more or less by our teaching can assist us even more by pointing out from their own experience of practice where our teaching methods have been deficient. We shall welcome candid criticism from any source, directed not to schools or individuals but to the methods which are more or less common to all.

Gynæcology is so intimately bound up with obstetrics that any attempt to teach these as separate subjects is futile, though there is much in each subject to be taught independently. It appears to me that our aims should be to give the student a good general knowledge of the special diseases of women in order that the practitioner may be able to deal adequately with the simpler cases, and to know when he ought to obtain more skilled assistance. Preventive gynæcology necessitates very thorough teaching : the prevention of infection, the prevention of the extension of infection, and the prevention and the early relief of various complications of pregnancy, labour and the puerperium, such as lacerations and imperfect involution. While advanced and operative work is for the post-graduate who has the time and opportunity for further study, our aim should be to stimulate every student to take a keen interest and pride in the advancement made and to be made in our knowledge of these subjects, and so far as in him lies to do something towards the elucidation of the many problems which await solution.

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[1] At a meeting of the Section, held February 6, 1919.

I propose to divide my subject under the following heads :—

(I) Subjects necessary to be taught.

(II) Methods of teaching.

(I) SUBJECTS TO BE TAUGHT.

The Obstetric Anatomy of the Pelvis.—This must be taught by the obstetrician.

The anatomy of the pelvic organs, not necessarily in minute detail, but the gross anatomy must be taught with the greatest accuracy.

The Physiology of the Generative Organs.—Menstruation, puberty, and the climacteric : This subject, so fundamental to gynæcology, is generally neglected by the teachers of physiology, and must be taught by the obstetrician whose experience will enable him to give the student a view of its far-reaching importance in health and disease mental and physical.

Pregnancy.—(1) The general structural changes in all parts of the body affected by pregnancy as well as the special organs and their functions, by which the symptoms and physical signs are recognizable in diagnosis.

(2) The general development of the ovum into the mature fœtus, placenta and other parts. (Minute details of development are unnecessary in this course.)

(3) Morning sickness.

(4) Duration of pregnancy and the prediction of the probable day of confinement.

(5) The various positions of the fœtus and the means for recognizing them.

Labour.—(1) The general process and phenomena.

(2) The doctor's and nurse's duties in preparation for and during labour.

(3) Anæsthetics and substitutes.

(4) Drugs—ergot and pituitrin.

The Puerperium. — The process in general and phenomena. Lactation; breast-feeding; care of the breasts; doctors' and nurses' duties: doctors' and nurses' fees.

Pathology.—(1) The pathology of pregnancy, intra- and extra-uterine; with the diagnosis and treatment.

(2) The pathology of labour: The treatment of many obstetrical complications should be taught, not only by methods applicable when skilled assistance, trained nurses and the most approved instruments are available, but in the circumstances in which the attendant has to rely on himself and simpler resources.

(3) The pathology of the puerperium.

(4) The pathology of the young infant.

(5) Artificial feeding of the infant.

(II) METHODS OF TEACHING.

We have now to consider how these various matters can be taught in the most advantageous way. In the discussion of this, the most important part of our subject, I suggest that we consider it without being tied to old customs and methods, rather to aim at the best that experience affords us.

The means at our disposal comprise demonstration-lectures, laboratory museum and post-mortem work, clinical work and teaching in wards and out-patient departments.

It appears to be obvious that all the subjects which involve diagnosis and treatment should be taught during the time that the student is engaged in his clinical work in obstetrics and gynæcology, and that instruction in obstetric anatomy, menstruation, normal pregnancy and labour should immediately precede this course. Also, that as the practice of obstetrics and gynæcology is the practice of medicine and surgery applied to special organs and conditions, the student should have completed his course in those subjects, including pathology with bacteriology, before taking the special course.

I think we may take for granted that the long, wearisome courses of lectures which were customary in the medical schools are not the best method of teaching any branch of medicine and surgery to students.

I am equally sure that good lectures, well illustrated by personal experience, are of great value to advanced students who have already been grounded in the principles of the subject and have begun to obtain some experience of their own.

I am equally sure of the value of demonstration-lectures, well illustrated and with plenty of viva voce questioning, which helps to maintain the close attention of the students, and enables the lecturer to discover if they have learned anything from his previous lectures. It is well to select men from the back rows for viva voce, men whose modesty or fear of the process lead them to take a back seat. One great advantage of lectures over the admirable text-books of the present time consists in the opportunities which the lecturer has for emphasizing and repeating points of fundamental importance and for illustrating them from his own experiences.

The subjects which can be well taught in this way are the obstetric anatomy of the pelvis and its contents, menstruation, the anatomy of pregnancy, of labour, of the puerperium, and the mechanism of labour, which should be taught with a fœtus, not with the fœtal skull only. I do not know of any doll which is sufficiently flexible.

The remaining subjects, comprising the great bulk of the whole, should be taught by demonstration-lectures accompanying clinical work in the wards and out-patient rooms.

With regard to gynæcology, the large out-patient departments of the hospitals, if properly organized for teaching, afford most valuable means of instruction, the students attending for three months and having charge of the cases allotted to them, preparing the notes and examining the patients individually with the physician. The chief difficulty I had personally during the thirty years that I assisted or was in charge of the out-patient department of St. Bartholomew's, was from the large number of patients who attended, and it was necessary for one of my clinical assistants to supervise the case-taking by the students and to prepare a list of cases so that I could select those I required for teaching. If the case-taking is done systematically, according to a scheme of which each student has a copy, and accurately (a very difficult thing for the beginner, the patient misunderstanding the question and the student her answer), he will gradually acquire the power of forming correct opinions about the nature of the ailment from the history alone; a very valuable asset to the young practitioner, especially in gynæcological cases, where the patient might hesitate to allow him to make a proper examination.

This personal responsibility for forming correct opinions for diagnosis, prognosis and treatment cannot be inculcated too soon; it is an unpleasant experience to have to begin to acquire it in practice. The amount of time that this kind of instruction takes is considerable, and much patience is needed, but the value not only to the individual student but to the whole class is well worth it, and it gives rise to much good humoured criticism not only on the part of the other members of the class, but often from the patient herself.

Out-patient obstetric work comprises two distinct departments:—

(1) The attendance by students on patients in their own homes.

(2) The attendance of pregnant women in the out-patient department of the hospital.

(1) The value of the former to the student, if he has had the necessary instruction as well as experience in the proper management of cases in the labour and lying-in wards, is very great. The responsibility he meets with compels him to find out his deficiencies on the one hand, and gives him confidence and self-reliance on the other. The results obtained bear witness to the care taken by students of their patients and to the great freedom from the calamities of obstetric practice. This attendance of patients in their own homes is also of great value in bringing the student into direct touch with the domestic difficulties and social relations of the poor, and in developing that sympathetic feeling for their troubles and privations so characteristic of our profession, and which is so often accompanied by practical advice and unostentatious assistance.

(2) The value of the training to the student attending this department is also great if he is held to be personally responsible for the history and examination of the patients. He learns to diagnose pregnancy when advanced, not usually a very difficult procedure, but one in which most unexpected mistakes are not very uncommon even in the practice of men of experience. He learns to diagnose the position of the fœtus and the presentation by abdominal and vaginal examination. He learns to measure the pelvis; if he also does this in the post-mortem room where he can compare his results with the actual internal measurements, he will be in a better position to realize the uncertainties and errors of the method and its great value in certain circumstances. He will occasionally meet with breech and other abnormal presentations, and will learn the easy and advantageous operation of external version. He will occasionally meet with other complications and learn

how to recognize and deal with them. He will examine the breasts, and learn what can be done to relieve conditions which may interfere with lactation. He will examine the urine, and in doubtful cases obtain a catheter specimen. He will examine the vulvo-vagina for evidence of infection, and learn to take the necessary steps for thorough disinfection and treatment. He may meet with cases of chorea or early mental trouble, but for the treatment of mental cases he must visit an asylum and learn the principles of treatment which, if properly carried out, are followed by such a high proportion of recoveries. Above all, he will learn the value of the systematic examination of all women advanced in pregnancy, and the advantage of being sure that all important details are normal before confinement, and be forewarned of difficulties and complications.

Gynæcology.—The chief difficulty in ward teaching at the present time is due to the abundance of surgical material which interests and occupies the time of the gynæcologist to the exclusion of cases of great importance for teaching. Some experience of the major operations, though advantageous, is of small value to the student; he learns too little of the minor gynæcology which will come to him in general practice, and he is induced to take little interest in cases not needing operative treatment. What for instance does the student learn about the treatment of the ordinary common cases of dysmenorrhœa, of the methods for the relief of cases of inoperable carcinoma, which he will have to attend to the end?

When we consider the clinical means for teaching obstetrics, that most important branch of practice for every general practitioner whose ignorance or want of care may lead to great suffering and long illness, and may even involve the life of his patients and their babies, and, indeed, that of his own wife and child; we find ourselves face to face with great difficulties. Owing to the better systematizing of our small resources we are somewhat better off than in 1906, when I had the opportunity in Toronto of discussing this subject in my address at the meeting of the British Medical Association. How can any branch of medicine and surgery be properly taught in an out-patient department only? and the department scattered over an area of say a square mile, with no real and effective supervision, and without the aid of competent nursing. Hospital authorities have provided a few beds for special cases, but though these are of immense value what are they but a pittance?

I am not of the opinion that the value of a hospital for teaching purposes is necessarily improved in proportion to the large number of its beds; this depends on the number being adequate and on the ability of those in charge of it to make the best use of them. At Queen Charlotte's, where I worked regularly for twenty years, we had admirable opportunities for teaching. We had the great advantage of teaching at the bedside and in the labour wards mixed classes of students and post-graduates, together with midwives and monthly nurses, and it would be difficult to determine who gained most from the mixed classes, the students who soon discovered how little they knew of the nurses' duties, or the nurses who gradually began to realize their own ignorance and the difference between their superficial training and that of the doctors. This combined training, if general, would in my opinion, also do much to place the relations of doctor and midwife on the friendly footing of mutual confidence and help that should exist for the benefit of the poorer women and their infants.

It is in the organization of maternity wards or hospitals in our great teaching centres, comparable to those devoted to medicine and surgery, that we must look for our next great improvement in the teaching of obstetrics, and without these we are severely handicapped in our endeavours. A three months' combined course in obstetrics and gynæcology, the whole time being given up to the subjects, would probably prove to be sufficient.

May we invite those present who have suffered at our hands during their student time to tell us what sort of men we have been turning out from the schools as regards their knowledge of these subjects? Are they generally competent, self-reliant, ready to take reasonable responsibility, or are they incompetent and timid, or worse still, reckless, rough and inconsiderate, and their patients left with unrepaired injuries to suffer for life or to crowd the gynæcological departments of the hospitals?

The Teaching of Obstetrics and Gynæcology from the Standpoint of Preventive Medicine.

By John S. Fairbairn, M.B.

I have chosen this aspect of the reconstruction of our teaching methods, because if we look at the trend of medical practice with a view to meeting its future developments, the most definite movement in medicine is clearly that towards its preventive side. It has already involved the introduction of new medical services, has thrown many additional statutory obligations on the general practitioner, and has increased and will continue to increase the proportion of whole or part time service demanded from the profession by the State and public authorities. The proposed Ministry of Health and the talk of a State medical service are further indications of how this movement dominates the situation. The gradual shifting of medical practice from a service almost entirely to the individual towards a service to the community must, therefore, be kept prominently in our minds in considering how our students can best be fitted for the part they will have to play when they are practitioners of medicine.

Another reason influencing my choice of subject is that I recently delivered myself of a short paper[1] urging the importance of developing the preventive bent in our students, and since it was written the case for reform in this direction has been greatly strengthened by the publication of the Memorandum on Medical Education in England by the chief medical officer to the Board of Education, Sir George Newman. My purpose this evening is to develop the position I took up in the paper just referred to with the help of the suggestive criticisms of Sir George Newman's memorandum, to which I will show my indebtedness by constant reference.[2]

I cannot do better than begin by selecting two passages from this memorandum in support of my argument and as a text for my remarks.

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[1] "Clinical Teaching in Midwifery and Diseases of Women." Read at the Inquiry on the Training of the Student of Medicine under the auspices of the Edinburgh Pathological Club, June, 1918, reported in *Edin. Med. Journ.*, 1918, n.s. xxi, p. 286.

[2] The figures in brackets at the end of quotations from the Memorandum are those of the numbered paragraph from which the passage is taken.

Sir George Newman's chief criticism on the teaching of obstetrics and gynæcology is: "Above all, the student is not being taught midwifery from the standpoint of preventive medicine. It is not sufficient to require mere attendance on twenty cases of childbirth, to be got through somehow. There are direct and serious responsibilities resting on medical practice during the ante-natal stage, at the confinement and post-natal. The maternal accidents of confinement, the gynæcological conditions following unskilful obstetrics and the infant mortality incidental to childbirth must be prevented. The need is insistent and widely recognized" [117].

In speaking of the teaching of preventive medicine, he says: "But much more important will be the revitalization of the whole subject of Medicine by the experimental, the scientific and the preventive spirit. For Preventive Medicine is not a subject which can be taught *ad hoc* or in a watertight compartment. Its purpose and its spirit should pervade the entire curriculum and system of Medicine—the Practice of Physic, Surgery, Obstetrics, Psychiatry, Pediatrics and the other specialities, for they all need the inspiration of the true preventive method, yielding a deeper and a wider consideration of each patient" [144].

Those words of criticism will be accepted by all as justified—our teaching has hitherto not been sufficiently "from the standpoint of preventive medicine." Before discussing the means by which "the revitalization of our teaching with the spirit and purpose of Preventive Medicine" is to be effected, I would like first to point out why we teachers of midwifery and gynæcology have special opportunities and therefore special responsibilities in this regard.

(1) The student comes to us trained in clinical medicine and surgery, having completed his general professional work, so that we have to deal not with the raw material but the nearly finished article, and are, therefore, responsible for his training at the most favourable moment for developing the preventive bent of mind. Early in his career it is disease in a readily appreciated and generally in a well-developed form that impresses the student—the failing heart with murmurs, thrills and dropsy, or the lump that can be seen and felt and perhaps handled after its removal by operation. When his education has proceeded beyond this stage ("the student who has an eye only to gross forms of disease has not been properly educated" [134]) the wider outlook is more readily developed and he is now in a position to appreciate the prevention of disease and the detection of its beginnings.

(2) A fully equipped maternity and gynæcological department can give a practical demonstration of prevention applied to a section of the community as cannot be equalled elsewhere in the hospital.

(3) His attendance on his extern cases affords an opportunity, to which I shall refer more fully later, of arousing his interest in the way his patients live and have their being, thus helping to meet another criticism of Sir George Newman's, that the student is not sufficiently taught to associate his clinical medicine with the social life and conditions of his patient [119].

(4) Midwifery is concerned with such questions as the birth-rate, the survival of the race and the rearing of a healthy stock; the start of life is the time at which all measures of preventive medicine must originate.

For these reasons, then, I urge that it is especially incumbent on us teachers of obstetrics and gynæcology to carry on the training of our students in this preventive atmosphere. How is it to be effected?

To begin with, midwifery and the diseases of women must be considered as two branches of one subject and studied clinically at the same time and under the same teachers. The old casual method of allowing the student to put in his maternity cases at a time dictated solely by his own inclinations and often independently of his gynæcological clerking has not entirely disappeared. I urged this conjoint clinical teaching some years ago,[1] and in the paper read at Edinburgh I advocated the systematic lectures as well as the clinical instruction being treated as one subject. Sir George Newman makes a point of the teaching of the two subjects of obstetrics and gynæcology being taken together [115]. In this way the study of the normal and abnormal processes of reproduction will go hand in hand with the diseases of the organs concerned in reproduction, so that cause and effect will be considered together—labour and abortion in the production of pelvic disease and pelvic disease in the production of abortion and sterility. This simultaneous soaking-in of the two divisions of the one subject is essential if the preventive aspect is to be emphasized. In the one the student is taught how to avoid the injuries and infections of childbed, and in the other is shown their consequences, immediate and remote.

I take it there will be no difference of opinion on the necessity of treating obstetrics and gynæcology as one subject and I will proceed to discuss what the medical school must provide for the adequate training of its students. It will be best considered under the following heads:—

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[1] *Brit. Med. Journ.*, 1912, ii, p. 1006.

(1) The complete maternity centre.
(2) The department for diseases of women.
(3) The staff for working the centre.

(1) The maternity centre will require both out- and in-patient accommodation for the pregnant woman, the woman in labour, and the mother and nursling. In many hospitals this will involve an increased provision of beds for maternity work, say five or six beds for pregnant women, a maternity ward sufficient to allow each student five or six cases indoors before attending cases in the outdoor district, and three or four observation beds and cots for mothers and infants. As this provision for teaching is absolutely necessary, it is useless for any of us to accept a *non possumus* attitude from our medical colleagues or hospital committees. The accommodation must be provided if the medical school is to train the practitioners of the future, and if it cannot be done by any school, then that school must go out of the business. A self-contained department within the hospital, or under its control, is clearly to be preferred, and will give the student a much better view of the work as a whole. It lies with us to press this on our colleagues and committees, but in the event of failure to obtain the best, arrangements must be made with lying-in hospitals, Poor Law infirmaries, maternity centres and infant welfare clinics in the neighbourhood, and the work of the student carefully organized so that he obtains a proper perspective of the scheme as a whole.

(2) Little need be said of the department for diseases of women, as it is part of the establishment of every hospital with a medical school. Provision must be made for the reception of cases of puerperal infection in all stages, and for cases of gonorrhœa in the earlier stages, as they are often withdrawn from the student's range of vision by being relegated to a special venereal disease clinic, thus spoiling the completeness of the preventive view.

(3) A full staff of workers is the necessary complement to the additional accommodation, and the student should be made to feel that for the time being he is one of them, though but a learner, and to recognize the place and duty of each member of the team. The staff will consist of (*a*) medical—the visiting and resident medical officers, with their understudies, the students; (*b*) nurses and midwives for indoor and outdoor patients; (*c*) almoners and health visitors for visiting the

patients in their homes, for staffing the social and educative organizations for the mothers, and for forming the connecting link with outside agencies for the assistance of patients.

I now come to what I feel is the most difficult part of my task, and that is how to describe the atmosphere in which the student should be trained in the practice of midwifery and diseases of women; and I have decided to risk the charge of being too commonplace and follow the student through his term of office, the length of which I will assume for the moment to be three months as at present.

In the clinic for pregnant women the student is taught not merely to look for the very beginnings of disease and for warnings that may spell danger later, but to consider the individual character, mode of life and home conditions of each patient as factors in her case. This one is a young and ignorant mother in her first pregnancy, perhaps unmarried and without prospect of making proper provision for her confinement or the care of her infant afterwards; the next is the overwrought mother of a large family; another has to go out to work if she is to obtain proper nourishment for herself during her pregnancy. The student finds that there are other considerations besides the purely medical aspect of the case; that it is important to know if the patient is a good mother who has successfully reared a large family, or is a shiftless creature who is satisfied with having buried more children than she has reared, and that these and other matters are of moment in deciding how the pregnancy is to be managed and what is to be done for the mother. The almoner or senior health visitor is constantly being called on for information or to receive instructions, and the student readily appreciates her place in the scheme, for she plays in this social and health work the same part the ward sister does in nursing.

In the maternity ward, the student having already learnt the routine of surgical cleanliness in the operating theatre, finds no difficulty in applying it to the woman in labour. Throughout the month spent in this ward the preventive side of the work is easily kept in view. All preventable conditions which occur are discussed as to why they were not foreseen and what could have been done—eclampsia, macerated fœtus, or some unexpected difficulty in labour. All failures as well as successes in ante-natal management should be emphasized, especially failures to breast-feed, retracted and sore nipples and such points which are not likely to attract the student's attention unless specially drawn to them. His interest is easily stimulated in breast-feeding as an important part of the prevention of infant mortality and is one of the matters on which pupil midwives, nurses and medical students can all be taught together. I generally have a few pupil midwives who attend the clinical instruction in the lying-in ward with the students and find it advantageous to both; when occasion offers, the duties of the midwife are discussed, and her relation to the medical practitioner, so that both pupil midwife and medical student may learn their respective spheres in the health service of the community.

Having learnt the routine management of pregnancy, labour, and lying-in under hospital conditions, the student then attends the rest of his cases on the district, where he has to adapt methods acquired under ideal conditions with every convenience to his hand to conditions quite the reverse. This in itself is a great education, but we teachers must try to make more of it as the unique opportunity the curriculum affords for the student to study patients in their homes, to see how they live and what is needed to improve their health and diminish infantile sickness and mortality. It is a point in which to my mind Sir George Newman has not recognized the educative possibilities. He speaks of the way the young practitioner goes out into the world almost entirely ignorant of the "setting" of his professional studies, of the relationship they bear to human society and the great social problems which he will soon discover to be pressing around him [119], but does not suggest the district practice as a help in gaining the required experience. The student should be associated in the work of the social side—obtain reports from it as to his patients, and be encouraged to make a report to it on ceasing attendance. If instructed on the proper points to observe he might give much valuable information as to the hygiene of the home, the woman's capacity as a mother, whether she followed her instructions as to the feeding and care of the baby, and possibly be able to offer suggestions as to special watching of the patient afterwards. In this way he will obtain a wider idea of how the health of these women may be cared for than any indoor hospital work will give, and he will also appreciate the co-operation of other workers.

I now come to that part in which the teacher of obstetrics in the past has especially been found wanting, and that is in regard to instruction about the new-born infant. So little was done that the student grown into a practitioner of medicine was quite incapable of taking his rightful place as the adviser of the mother on the health and upbringing of her babies. He attended the mother at her labour, handed the infant "mewling and puking" into the nurse's arms, and from that moment abdicated his position to the monthly nurse and her successor, the children's nurse, save when the infant's ailments had developed to so grave a degree as to alarm the mother and make her think it was beyond the capabilities of even her most capable nurse. Hence the common view that the doctor is little use for what are thought to be the minor disorders of infancy, and yet unless the infant is under constant observation prevention has little opportunity. Perhaps the most needed reform in our obstetric teaching is that a greater effort must be made to interest the student in the study of the baby, and to keep up the study long after the infant has passed from our care. This leads up to the very important question which must create considerable discussion as to where the dividing line between obstetrics and pediatrics is to be drawn. The baby—the product of reproduction—must be a charge of the obstetrician for the first few weeks, but once mother and infant pass into the baby clinic the question is more difficult. At St. Thomas's the clinics for infants up to twelve months have been supervised by the Obstetric Department, but that was because they evolved out of that department. The extension clinics for children up to school clinic age are supervised by the Department for the Diseases of Children. Though this is but an evolutionary phase there is something to be said for mother and nursling remaining under the Obstetric Department and the weanling and older children going to the Children's Department. The mothers who were patients of the obstetric side during pregnancy, labour and lying-in are known and understood and more readily influenced by its officers; difficulties in breast-feeding and the overcoming of them are frequent problems in the maternity ward and naturally a continuance of the same interest and supervision is advantageous. However, the plan we have in contemplation is probably the best compromise, and that is the appointment of a special officer for the child-welfare clinics who will begin by taking part in the teaching on the infant in the maternity ward, where he will become known to the mothers and learn to know them, and thus preserve continuity from the maternity clinics to the baby clinics.

It is the personal touch between mothers and medical officers and other hospital workers which is essential to success in gaining the mothers' confidence and educating them in the bringing up of their families, and hence unless some liaison officer, such as I have mentioned, is appointed, the work will suffer by the mothers coming under fresh and unknown supervision. But some such arrangement is necessary because it is clearly impossible for the obstetric officers to undertake the great additional service which out- and in-patient infant welfare involves, to say nothing of what it will grow to. The beds for mothers and nurslings need be but few—three or four will suffice, unless the department is very large—and into them will be admitted cases of difficult breast-feeding and such like: they are as necessary for the student's education as for the mother's.

Whether the obstetric side resigns the nursing mother early or late, there is no doubt the student should follow the mother and child through the clinics so as not to lose the practical object lesson in prevention which a complete survey of the scheme gives him. The curse of the examination system is at present our great difficulty: the examination lags ages behind practice requirements and loudly calls for reform—root and branch. It has become our master instead of our servant, and the sooner we teachers put it into its place the better for our teaching. However, that is another story, and all I would point out now is that the student's time is so far occupied with work that has a distinct examination value that he cannot spare the time for work that has only a practice value, and therefore little more than casual attendance at the welfare clinics can be expected, except perhaps by a few of the more far-seeing or specially interested students. What I would urge is that every student should have a six months' training in obstetrics, gynæcology and pediatrics. The first half of this term would be as sketched, and would be followed by three months in the various children's clinics. I am not going beyond my subject, because the reform for which I am agitating is to give the student a complete view of a preventive scheme while training him in midwifery and diseases of women, and, to widen his horizon, he should follow the baby, whose intra-uterine development and birth he has watched, through its early extra-uterine development—certainly so long as it is directly dependent on its mother for its sustenance. By breaking off his study of mother and infant at the end of a fortnight's lying-in time is to lose what might be made the greatest lesson in his medical course of the care of the national health and physique.

The last point to which I would draw attention is the "psychological aspect of preventive medicine hitherto greatly neglected" [142]. This neglect is largely due to the preponderating influence both on our work and on our mental attitude of the striking advances in surgery which have characterized the last few decades. We have become so absorbed in operative work, and hospital accommodation has been so monopolized by operation cases, that our teaching material is in no way representative of the future practice of our students. Our mental attitude towards our patients and their symptoms has lost balance and swung too far towards mechanical explanations — displacements and kinks and hypothetical local affections — and mechanical cures by operations of the "pexy" and "ostomy" type, in the devising and carrying out of which much ingenuity and manipulative skill has been expended. The resulting tendency has been to overlook the most common of all factors in the production of disability, overstrain and mental stress, and we must redress the balance. In women with pelvic symptoms such causes as domestic worries, family anxieties and marital and sexual troubles play so important a part that Sir George Newman's words are specially applicable. He says: ". . . the whole man must be dealt with, for he is something more than animal. His body is, in greater or less degree, the instrument and expression of emotion, intellect and will. . . . Nor is the individual, taken at any one moment, the whole of the issue. There is his life-history, his heredity, his family, his domestic life, his personal habits and customs, his home as well as his workshop. In short, preventive medicine to be effective must deal with the man, the whole man, as an individual as well as member of the community."

We must, therefore, see that our gynæcological beds are occupied by cases more closely representative of general practice, impress on our students the necessity of considering the psychological factor and teach them to study and treat not merely the disease but the individual patient and the special problem she presents.

In concluding this paper the gist of my argument is that we must acknowledge the special responsibility on us to create an atmosphere of preventive medicine round our teaching, and for this purpose every medical school must be provided with a complete maternity and child welfare centre. By co-operation with the pediatric side instruction covering a period of six months should be continued from midwifery into child welfare, so that the student, while acquiring the practice of obstetrics, gynæcology, and pediatrics, is made to feel that he is playing at any rate a minor part in a scheme of preventive medicine, the complete working of which he can visualize. As the study of obstetrics and gynæcology brings to the student "new applications of his clinical experiences, new social relationships" [117], it is incumbent on us not only to teach the actual practice of these subjects but to give the student a wider outlook and to teach him to apply his professional knowledge towards increasing the resistance of the normal to disease and arresting the progress of incipient disease and so raising the whole standard of the health and physique of the nation's mothers and children. This involves a fuller consideration of the social factor, the psychological factor and other factors affecting the life and well-being of the individual patient and of the community as a whole.

The Teaching of Obstetrics and Gynæcology from the Point of View of a General Practitioner.

By LOVELL DRAGE, M.D.

THIS question is only a part of the whole subject of the education and training of the medical man; and is one of very great importance not only to students but to the community. The first point to which I draw attention is the increasing demand made upon the time of the student by the teachers of special departments. At no period have heavier demands been made for the inclusion of new special subjects into the curriculum than at present: and if every professor in special subjects were to be humoured, I would not envy the lot of medical students. Examiners, where work is very specialized, it is needless to observe, are usually hard taskmasters in the examination room.

In what way, then, can the time of the student be saved? It can be saved by the exclusion of the preliminary subjects of study: chemistry, physics, morphology and physiology. These subjects, of so great importance to the basis upon which the structure is to be raised, should be undertaken previously to registration as a student; and, until a sufficient test has been applied, registration should be denied.

When a student has obtained a sufficient grasp of the main elements of these sciences, and has shown that he can work intelligently in the laboratory, he will be a comparatively easy student for the professors of the early professional subjects to teach, and a great alteration can be made in the teaching of those subjects.

At the present time a student begins the study of obstetrics and gynæcology with a course of lectures and instruction in the wards, after a course of lectures and instruction in the wards in medicine and surgery.

A very large part of gynæcology is purely surgical and should be treated as part of the course in surgery. There does not appear any reason why a surgeon who is a first-class operator should not perform operations in the pelvis just as well as he performs them elsewhere. The conclusion which is drawn is, that the subjects to which the teachers of diseases of women and midwifery should devote themselves should be just those which were theirs before surgery arrived at its present state of perfection. The special importance of a knowledge of the various infective agents should never be out of the mind of the student—and I cannot believe ever will be if the course in general pathology has been sufficiently appreciated. If practitioners would but consider it a disgrace when they have a case of infection after delivery, there might be a chance of the practical banishment of puerperal fevers caused by infection.

In the by-gone times of studentship and early practice these infections were very much in my mind. But the knowledge which I possess of them was not obtained by courses of pathology, but was gained by subsequent hard work. The paper which I wrote and published on puerperal fevers in 1894[1] (or rather the work which I put into it) has saved many women from suffering at my hands as an accoucheur. Knowledge of the infections of the genital tract of women is of more importance to the general practitioner than a knowledge of anything else in the whole of the subject of obstetrics and the diseases of women. There is now no reason why the student should not have instruction to begin where I leave off. The knowledge of pace in a jockey is the knowledge which gives him pre-eminence in his calling. Quite other characteristics make him a good jockey; but in a tight place it is the knowledge of pace which pulls him through a winner. What training produces this knowledge it is difficult to state; and so it is with the practice of midwifery—the judgment which determines the action of the practitioner makes all the difference in success to his efforts. I must confess that I do not know what course of training will produce this desirable quality, except such a course as will make a practitioner go over in his mind all the details of his procedure after the conclusion of a case in which difficulties have arisen, even if a satisfactory issue has been arrived at.

A great teacher such as Matthews Duncan could produce this sort of method in the mind of a student. But I do not suppose he could have explained how or why he achieved it. A teacher is either great or he is not. C. B. Lockwood was a great surgeon, and was successful as a teacher because he made students think by asking them questions, and by his insistence on the necessity of using eyes, hands, hearing, and finally, reason, before making a diagnosis. He often said, "We enter the temple of science through the portals of doubt," and he quoted Buckle: "Without doubt there will be no inquiry, and without inquiry there will be no knowledge." Again he has said: "The true teacher may be known because he tries to educate, but not to instruct; education teaches to think. But it is not enough to know what words mean to yourself; try and learn what they mean to others." It would be well if many of the followers of vaccine therapy would adopt the method of Matthews Duncan, when discussing puerperal fevers in 1880: "The ideas suggested by the researches of Pasteur, of Toussaint, of Greenfield, and Buchner may prove to be *ignes fatui;* but they may prove, on the contrary, to be true guides." Well, they have proved true guides, but Duncan, as well as Lockwood, entered the temple of science through the portals of doubt. The late Professor Kanthack was a great pathologist and a great teacher. I did not know him as a student, but came across him some years after I was in practice. His success as a teacher resulted perhaps from a sympathy which enabled him to listen to anyone who took an interest in his subjects; and he would not dismiss a questioner because he talked what was possibly nonsense, or something like it, to him. His sympathy was great, his knowledge greater; and he was always ready to assist the inquiring mind. His was a personality of the most charming kind. Much depends upon the teachers of the subject and much less on schemes of teaching. Machine-made schemes of the most copper-plate variety look well on paper—very well. They attract the attention of prospective students; and the students pass their examinations with credit to the copper-plate scheme. But what happens to the students afterwards? Professional gentlemen they are turned out, and professional gentlemen they will remain—no doubt a credit to the scheme of training, but as practical scientific men they may be very deficient.

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[1] *Lancet*, 1894, i, pp. 461, 523.

If students have been sufficiently grounded and have been, not trained only, but educated, a very short time will enable them to grasp sufficiently all the details of obstetrics and gynæcology. The subjects are not large in themselves, and three months will be sufficient time for them to expend before examination at the final Board.

The question now arises—especially in view of the prospects held out by the promotion of a Ministry of Public Health—whether all students should be compelled to undertake the subject before registration as practitioners. As a matter of fact, I was placed on the Medical Register having passed the final examination of the Royal College of Surgeons and was not examined in midwifery. I do not think my knowledge of midwifery was less because I was not examined in the subject. Be this as it may, a great many men do not intend to practise obstetrics or dabble in gynæcology; and there does not appear to be any reason why the time and energy of such should be wasted in cramming up sufficient knowledge to pass an examination. The fetish of examinations and titles has obsessed the mind of the medical profession to an extent which obtains in no other profession.

I have seen it stated that the Ministry of Public Health will make many jobs connected with maternity and childhood, and that it will be the duty of medical schools to train people to undertake them. I have been trying to think of the nature of the work which will be demanded of these practitioners; and it appears to me that the work will be such that any sufficiently trained midwife would be able to undertake and that it will be work which will lead the practitioner who undertakes it to a dead-end. There would be no need for a scientific education such as I have tried to delineate, any more than there is for such a performance as that of school inspection of children. It will be ordinary hack-work, conducted under red-tape rules and regulations issued by officials. There will be an immense amount of clerical work and a life of destructive stagnation. It is impossible to imagine a more horrible position for any educated man. If teachers in obstetrics were compelled to train students for such work, courses of instruction must be made for two separate groups: the first course, in which real education is attempted; the second, in which no more than training is given. Under these circumstances:—

(1) Students who intend to practise in obstetrics will pursue the first course.

(2) Those who intend to take up hack-work at Maternity Centres will pursue the second.

(3) And perhaps, students who do not intend to practise obstetrics will attend neither.

The basis for the demand to the medical profession that it should take up the work of supervision over Maternity Centres appears to be that it is impossible to manage an A1 Empire with a C3 population. One reason for the statement that we are a C3 population is that the medical profession for many years past has successfully prevented the destruction of the class which in Dame Nature's scheme is classed as unfit. In addition, the birth-rate has steadily declined. In my sanitary district in 1886 there were 220 births, for the five years before the war the average was 190 with an increase of population of nearly 2,000. The proportion of the fit to the unfit who are born into the world is probably about the same as it has always been, but we have by our attention to the unfit increased the numbers of the unfit who reach maturity.

Nature provides, if left alone, a large excess of increase in our species in order to provide for the loss of the unfit. The medical profession prevents to a considerable extent the loss amongst the unfit, and other factors have diminished the excess in production.

It does not appear that there is any reason to suppose that the supervision of pregnant mothers will produce any other result than that of raising up to maturity more unfit adults.

The production of a healthy stock depends upon the healthy condition of the parents, and the resistance to disease depends upon factors which at present are little understood. The practical question remains, Is a large expenditure of public money justified in the absence of any reason for supposing that a larger stock of healthy children, who have strong resistance to disease, will result?

The PRESIDENT.

From my own standpoint it seems that one of the most urgent needs in any scheme of reconstruction is that some use should be made of the enormous amount of clinical material in special hospitals. There is some post-graduate teaching, but the clinical material in those hospitals is altogether wasted for official teaching of students.

Dr. AMAND ROUTH.

This is a well-timed discussion, as, for the first time in our national history, it is recorded by the Registrar-General that during the past year in England and Wales the civilian death-rate is actually above the birth-rate, so that natural increase of the population has temporarily, at all events, ceased.

Gynæcology can be taught in the Out-patient Department, the wards and the operating theatre more easily than obstetrics, and care should be taken, as Dr. Fairbairn says, to reserve a due proportion of the beds for minor and plastic operations and not to fill all the beds with tumour cases.

Dr. Lovell Drage's proposal that general surgeons should perform the operations which are now performed by gynæcologists would be a retrograde step. Does he mean that the general surgeons should teach as well as practise gynæcology, and does he propose definitely that the teaching and practice of obstetrics and gynæcology should be in separate hands? If so, surely he fails to realize that, apart from tumours and infections, almost all gynæcological operations are required for conditions complicating pregnancy and labour, or due to injuries from faulty or difficult labour, the prevention or removal of which conditions must remain in the hands of obstetricians. Where can the line be drawn?

Obstetrics covers a very wide range. In private practice the patient may have needed occasional advice from puberty to the date of her marriage. Her subsequent pregnancy is supervised and labour is conducted carefully, whilst lactation and weaning, and the periods between pregnancies may need attention.

The children should be supervised, not "from the cradle" as used to be taught, but from conception, and the child's "infant welfare" should be the aim of the family doctor to the end of the first year and, if opportunity offer, to adolescence. Such continuous supervision is impossible in hospitals, but there should be a following up of the pregnant mothers, not as individuals but in groups representing successive stages involving ante-natal, natal, neo-natal, as Dr. Ballantyne calls the first month of life, and post-natal periods to the end of the first year, during which time the mother and child can be usefully seen together. The student would then realize that unrecognized or delayed removal of abnormal conditions in one stage tends to difficulties or functional disorders in the next.

In a lying-in hospital the ante-natal clinic should be obviously an important part of the training of the students and midwives, and would there be attended by those actually engaged in their practical midwifery. In general hospitals where district midwifery cases are attended, or where special maternity wards are provided, the ante-natal clinic would take the place of the old registration of expectant mothers, except that now an expert would be in attendance. If such cases were few, they would be more easily seen in the out-patient gynæcological department. Obviously, students who have acquired some knowledge of general medicine would be better able to appreciate the complications of pregnancy. A clerk who has served for a month in the gynæcological department could usefully serve another month in the ante-natal clinic and then serve another period in the ward.

Teaching in the ante-natal clinic is the most useful for future practice. Amongst the subjects there taught the following may be named: the recognition of venereal disease and the recently proved safety of dealing with syphilis by salvarsan during pregnancy or after birth; the recognition of tests for early toxæmia, especially now that "accidental hæmorrhage," with its 75 per cent. fœtal mortality, is believed to be often toxæmic in origin, and may be preventable; pelvic contractions, both the major and minor varieties; the previous maternity history of the mother and her children, such complications as heart or bronchial troubles, old kidney disease, diabetes, Graves's disease, or pregnancy pyelitis. Ante-natal cases requiring further investigation or treatment would be admitted to the ante-natal ward or to the reserved beds of the maternity ward; venereal cases would be admitted to the reserved beds in the venereal wards. Labour, whether natural, prematurely induced, manipulative or operative, would be used for teaching in the maternity ward, together with knowledge regarding lactation, and hand-feeding where lactation fails. Useful practical experience may be acquired by attendance on cases in their own homes, after holding office in the ward.

After the first month of the puerperium mother and child should visit the gynæcological and the infant welfare departments, which should be held at the same time, so that both could be seen during one attendance. This would enable early pelvic troubles in the mother and beginnings of constitutional disease in the child to be detected.

Students should be taught to assist in laboratory research of all sorts, such as examination of milk, special urinary tests for toxæmia, examination of all expelled products of conception for detection of spirochætes and other causes of death, attempts to unravel the mysteries of toxæmia and of the functions of the syncytial ferments.

Opportunities should be found for giving students information on the causes of sterility due to malformations, gonorrhœa, or results of operations, plumbism or X-rays, &c.; on the causation of the low birth-rate, such as sterility or criminal abortion, and methodical, chemical or mechanical restrictions of child bearing. The responsibility of doctors in cases of criminal abortion and infanticide are also useful subjects to learn before private practice begins. A doctor should also know how the expectant and nursing mothers can obtain extra diet and extra pecuniary separation allowances and pensions benefits.

In urging the necessity of better obstetrical teaching, it is important to contemplate the fact that out of 1,000 conceptions probably 250 infants die during gestation and before their first birthday, and that this proportion of deaths is doubled in illegitimate cases.

Dr. Drage's statement that "medical supervision would do no more than raise up to maturity more unfit adults" is extraordinary. Does he mean that the 200,000 lives saved by a reduced infantile death-rate in the last seven years are to become "unfit adults"? Does he think the children saved from craniotomy by induction of labour a fortnight before full term, or those delivered by a pre-arranged Cæsarean section are going to be "unfit"? There is surely strong evidence to the contrary. There seems every reason to believe that if the methods advised in the first two addresses to-day should be carried out, at least half the ante-natal and early post-natal infantile deaths would be avoided, for doctors will be thoroughly equipped in the preventive hygiene of pregnancy, parturition and the puerperium.

Dr. G. F. Blacker.

We should seek an answer to two questions: (1) Why is the standard of teaching in midwifery not at so high a level as that of medicine and surgery? (2) Why is the reputation of the London school of obstetrics for research so relatively poor?

The answer to the first question is to be found in the fact that most of the practical teaching is done by junior registrars and house surgeons who often have become qualified only recently. From the very nature of the work it is generally impracticable for one of the honorary staff to be present when patients require operative interference in their confinements, and a student may well pass through the whole of his midwifery training and never see one of the senior staff conducting an ordinary confinement or performing any one of the common obstetric operations. It is impossible to arrange for practical teaching in midwifery at the bedside or in the theatre at set hours, and therefore a great deal of this part of the teaching has to be done by junior men with but little experience. It is quite easy for senior members of the surgical and medical staff to carry out teaching at the bedside, but it is very difficult for the senior obstetricians to do so. In my opinion, then, it is necessary not to consider what the student should be taught, but how he should be taught and what changes are possible to overcome the present unsatisfactory state of affairs. There is only one way out of the difficulty—namely, the provision of four or more large lying-in institutions in different parts of London, in which the student could receive his practical teaching in Midwifery, Gynæcology and Maternity and Child Welfare under the same roof.

These institutions should be large enough to provide for all the medical students in London, and must be officered, if the students are to be taught properly, by resident whole time properly paid senior teachers. They should be either whole time or full time: by the first I mean debarred from private practice altogether, by the second compelled to devote so many hours a day to their work and not allowed during these hours to undertake any other work. They should further have the services of whole time paid assistants, and all the laboratory facilities necessary for the proper carrying out of the pathological work concerned in the treatment of their patients and also for research work. The present lying-in hospitals have not, in my opinion, justified their existence so far as teaching is concerned; they should be closed or amalgamated with these larger institutions. The student should be required to spend four months in the practical study of midwifery and gynæcology, two of which should be devoted to gynæcology and two to midwifery. During his term of duty in midwifery he would be resident in the institution while on duty in the wards, and then would spend the second month of his attendance doing duty in the extern maternity department. In these circumstances students would receive their teaching from teachers of equal standing and experience to those engaged in the teaching of practical medicine and surgery, they would have ample opportunities of seeing large numbers of gynæcological and obstetrical cases, and at the same time would be able to attend in the Maternity and Child Welfare Department.

It would further be possible to carry out the students' practical training in the best possible surroundings. The present small number of lying-in beds in most of the general hospitals are of very little value, and are wasted in most cases, as it is impossible for the students to live near or in the hospitals, and they are therefore not available when wanted to attend at emergency operations.

Arrangements of this kind would enable any man who desires to do so to carry out research work with credit to himself and his School, and such a development would be in keeping with the schemes which are on foot at the present time for the appointment of whole time paid teachers in medicine and surgery. I do not think that anything short of this very radical change would ever succeed in improving the present unsatisfactory methods of teaching practical midwifery in London.

Dr. T. W. Eden.

Speaking of the London schools, I think that the obstetric teachers need reconstructing quite as much as their methods of teaching. Teachers should be men with a fair amount of leisure, and teaching ought to be their principal occupation. In the case of too many of us, our teaching is only an incident in a very busy life. This is largely due to the system of holding multiple hospital appointments which prevails in London. This, again, is due largely to the fact that the teaching hospitals, at any rate the smaller ones such as that to which I belong, are overstaffed. In consequence the junior members of the medical staff cannot obtain the clinical opportunities which they require, and they take other appointments at non-teaching hospitals in order to obtain them. It is not uncommon for men to hold three or four appointments at hospitals scattered over various parts of London, and thus they become overwhelmed with routine work, and their teaching inevitably suffers. Conditions which do not admit of the younger teachers concentrating upon their teaching hospitals are necessarily disadvantageous.

And, further, it must be admitted that many men holding "teaching" appointments do not take their duties as teachers very seriously. Dr. Fairbairn well said that the clinical material in our wards ought to be fairly representative of the future practice of our students. On looking over the ward of a general hospital we might often find that the greater number of the cases, and sometimes all, were there, not because of their value for teaching purposes, but because they had previously been seen in consultation with general practitioners. Or they may be practically all cases of the same kind, admitted because the surgeon or the specialist has gained renown in the performance of a particular operation. Such conditions as these really constitute an abuse of our trust as teachers, and no mere alteration of the syllabus will effect the changes which are necessary.

In general I agree with Dr. Blacker that large central institutions are necessary, which must be staffed by teachers of experience, who will be adequately remunerated and will devote their whole time to their work.

Dr. EARDLEY HOLLAND.

All teachers of obstetrics will entirely agree with the openers of this discussion that the present system of teaching and practice of midwifery in the medical schools is totally inadequate to the needs of students and patients alike. The present system implies the extern midwifery district unsupported, or feebly supported, by in-patient maternity beds. Many of the public think it more than inadequate; they think it scandalous. The pity is that we have not moved in the matter until forced by the pressure of public and official opinion.

Amongst factors contributing to the neglect of proper teaching to the student may be reckoned (1) the claims of the midwife, who absorbs nearly all the teaching maternity beds in London; (2) the apathy of the modern gynæcologist to "common or garden" midwifery, and his absorption in the purely surgical aspect; and (3) the bad conditions of midwifery practice for the doctor in all but well-to-do families. The time element is the important one in midwifery, and a doctor cannot afford to give the necessary time, especially the waiting and watching during labour, for the little fees that poorer patients can only afford. I think the feeling has been subconscious that it is hardly worth while training a man to a standard he can scarcely ever hope to keep up in after-life.

I am very glad two of the opening speakers have emphasized the need for obstetrics and gynæcology being treated as one subject for teaching and research; their division into separate departments, under separate heads, would be a great disservice to both. I hope this Section will pronounce officially on this point, as there is a small body of opinion which favours their separation in order that the infant may receive more attention from the obstetrician. This brings me to a point I wish to emphasize. There is no doubt the infant has been neglected. I know no obstetrician who is really interested in the diseases of the infant, and who knows much about them. The pædiatrician is not much better; any pædiatrician I have seen faced by a very sick infant was a perplexed man. The reason is quite obvious: he has never had a chance to study the infant, which has always been regarded as the special property of the obstetrician and his female satellites. The study of the infant should be taken out of the hands of the obstetrician and placed in those of the pædiatrician. The problem of the infant is a problem of general medicine and pathology, and a very complex one too; if the obstetrician wishes to study the infant as he ought, then he had better give up surgery and take to pure medicine. The infant is linked to obstetrics by the function of lactation, and by a few transmitted diseases; beyond this, it lies quite outside the things that make up the science and art of obstetrics, and belongs to a different branch of medicine. In an obstetrical and gynæcological unit, such an academic unit as it is hoped will be formed for teaching purposes, I should like to see the whole of infant study and teaching, normal and pathological, taken over by a pædiatrician, who would work in conjunction with the unit.

Dr. Drage states there is no reason to suppose that the supervision of pregnant women will have any other result than that of raising up to maturity more unfit adults. No statement could be less true or could display a greater lack of knowledge of what is done for the fœtus, quite apart from what is done for the mother, by the supervision of pregnant women. There is a great deal of confused thinking about the ante-natal care of the fœtus. Some credit it with being able to do too much; others, like Dr. Drage, think it will do harm. What actually can be done for the fœtus by the supervision of pregnant women? The list of things is a small one, but each one is of vast importance, and proper management after diagnosis means an immense saving of fœtal life and infant disease. The correction of malpresentations, the treatment of contracted pelvis, syphilis, albuminuria and pelvic tumours almost exhausts the list. There is no reason to suppose that fœtuses, saved from death by the induction of premature labour or by Cæsarean section in cases of contracted pelvis, or by external version in cases of breech presentation, will grow up into unfit adults, or that the same fate awaits a series of fœtuses born of a mother cured of syphilis.

Sir Walter Fletcher, K.B.E., M.D., F.R.S.

In the first place, I do not like speaking of "defects" in regard to a body of teaching which has done so much in the past. Within the present conditions and limitations, it seems to me, on the whole, admirable. But I agree heartily with Dr. Blacker, who urged so forcibly that there is need now for a vast change. Dr. Fairbairn was right, I think, when he said that the chief defects of the present system are in the instruction given for the period after birth. What has struck me as a teacher—away from London,—as a teacher of physiology, is that the normal physiology of the process of reproduction, taken in a wide sense, is not sufficiently brought to the student's notice. That, I think, is the real explanation of what Dr. Fairbairn found wanting when he urged that the preventive view should be taken, rather than the curative. Unless the physiology of the whole sequence of the phases in the reproductive process is made the basis of gynæcological teaching, then the preventive point of view will be lost sight of. The blame for this defect is to be shared, perhaps, equally by the physiological teacher in the earlier part of the course and the gynæcologist later. I think it is exceptional, indeed almost unknown, for a man at his qualification to know the normal physiology of, say, uterine muscle, or of the process of lactation. That, at least, is my experience, and I have devoted some effort to following that out. The physiologist loses greatly, I think, by not introducing some of the examples he might get from gynæcological science at an earlier stage in the student's life. The uterine muscle might supply admirable lessons in the behaviour of muscle, and the mammary gland a beautiful illustration of the laws of secretory activity. These should be taught again when the student is in the gynæcological institute. How many men, at qualification, have any clear idea of the physiological laws of the mammary gland, or of the well-known and attested fact that if the gland be not emptied, its activity and efficiency declines? Also, that the later portions of the milk contain the chief part of the fat? And what the significance of that is in relation to the accessory food factors for the diet of the child? Also, what is the optimum frequency of putting the child to the breast? I think it is true that those things are rarely, if ever, present in the minds of the men on qualification, and I think they are largely absent in the professions, both of medical practitioners and of nurses. I think that proper opportunities for teaching and research can only be fully secured on the lines which have been indicated by Dr. Blacker.

Dr. F. J. McCann.

I agree with what Dr. Blacker has said about maternity hospitals. London, the greatest and richest city in the British Empire, and, indeed, in the world, does not contain a single large maternity hospital. It is true that there are several of small size, Queen Charlotte's Hospital being the largest, but they are totally inadequate in proportion to the size and importance of this great metropolis. There should be State subsidized maternity hospitals not only in London but throughout the country. These hospitals should not be State controlled or controlled by parochial authorities, but subsidized by the State. I suggest that this Section should urge upon the Government the desirability of providing these hospitals without delay.

This question of the teaching of obstetrics has been brought into prominence largely through the increasing numbers of women who, as midwives or nurses, are desirous of receiving instruction, and for whom facilities must be found. Obstetrics must be taught either in a maternity hospital or in a well-equipped special department of a general hospital. In addition to a small visiting staff there should be a whole time official or officials with assistants comparable to the "Chef de Clinique" in French hospitals. This official should be appointed for five years at a salary of not less than £500 per annum. He should assist in the teaching and should do research work. He should have a knowledge of modern languages, and for one month in each year should be obliged to visit clinics both at home and abroad, and bring back a report to his hospital or department. From the nature of obstetric work a resident teacher is required who will be at hand to demonstrate to and instruct the students when complications are encountered.

The present system of training the specialist and future teacher is a bad one. The house surgeon of to-day may settle down in practice in Wimpole Street or Harley Street to-morrow. He then proceeds to learn his work and becomes attached to different hospitals in order to gain clinical experience, with the result that he cannot do the work of any one appointment really well. Moreover, many of the most brilliant intellects are lost to the schools because of financial reasons; the poor man is forced to join the services or to go into general practice in order to earn his living. By providing well paid appointments such as I have suggested our future specialists and teachers would have a thorough training, and would have the opportunity of showing whether they were capable of teaching and able to do research work. In this way I believe we should have better specialists and more inspiring teachers. The teachers, too, must be better paid. As a result of the recommendations of the Haldane Committee a Ministry for Research and Information is about to be formed. From this ministry funds will be provided for the encouragement of research, and will be given to those who are capable and willing to do the work.

For the purpose of providing increased practical facilities for obtaining a knowledge of obstetrics and gynæcology in London it is proposed to amalgamate Queen Charlotte's Lying-in Hospital with the Samaritan Free Hospital for Women. Thus 140 beds will be available for clinical instruction, and I hope to see established herewith a department for after-results. Such a department should exist in every well-equipped hospital. Consider what a wealth of material is lost both to the student and the teacher from the absence of such a department. For example, we should realize what permanent disability and suffering may result from what is termed normal labour, and thus be enabled to carry out Sir George Newman's "preventive idea" to the fullest extent.

In conclusion, in order to provide increased clinical opportunities special departments must be enlarged or affiliated with existing special hospitals. It is only a question of time before the teaching of obstetrics and gynæcology will pass into the hands of hospitals specially equipped for the purpose, and then, and then only, will London become an important centre for the study of these subjects, and attract students and graduates from the four quarters of the globe.

Dr. E. L. COLLIS.

I desire to deal with only one aspect, that of the woman industrially employed. During the War the nation suddenly discovered that many women worked. Women worked before and will continue to work in the future to even a greater extent. The duty devolved upon me in the Ministry of Munitions of replying, or trying to reply, to such questions as: (1) What work may a young girl or woman, i.e., a potential mother, be allowed to undertake? (2) What weights may she lift? (3) For what hours should she be allowed to stand? (4) What risks are entailed?

(5) What is the effect of industrial work upon menstruation? (6) What work may the expectant mother do? (7) At what period of pregnancy should she alter her work? (8) How soon after confinement should she be allowed to resume work? and, again, What sort of work? (9) How can such women carry on breast-feeding?

May be the great teachers here present have looked into these matters, and can reply with full scientific knowledge. If not, I urge you to acquire this knowledge; while, if you have it, I even more urgently desire you to impart it to the coming generation of practitioners who most assuredly will have to reply to such questions. In April, 1918, there were in this country 4,800,000 women employed in industries and professions, and normally we may probably expect in the future about 4,000,000 to be so employed. But female employment cannot be estimated to last for each individual for more than ten years on an average; and if the expectation of female life at 15 years of age is forty years, then each employed person represents three others who have been so employed. That means that in this country some 16,000,000 females at any one time are either going through or have already gone through the occupational mill. Employers of labour are more and more coming to retain the services of medical officers. What answers are you teaching them to give to these rudimentary questions? What answers, that may prevent the need for the practice of gynæcology, that may promote health, lower infant mortality and increase the birth-rate?

Mr. Victor Bonney.

As a teaching system must be judged by its end-results, it is obvious that there is something fundamentally wrong with obstetric teaching in this country. The Registrar-General's returns for England and Wales show that the maternal death-rate due to pregnancy and labour has remained at somewhat over four deaths per 1,000 children born alive for the last seventy years! The Scottish figures are rather worse. Over a period during which enormous advances have been made in every other branch of the medical profession, obstetrics, as judged by the results of obstetric practice, has remained nearly stationary. The reason for this is that midwifery is neither regarded, taught, nor practised as a branch of surgery, whereas it is in fact a pure surgical art and moreover, of all the branches of surgery, it is that in which the surgical attitude of mind and the scrupulous observance of surgical technique is most essential.

The failure on the part of the teachers to adopt this conception of the art they teach is reflected in the practice of the profession at large, and as a result the public, who take their tone from the profession, habitually underrate the dangers of pregnancy and labour, and thus there persists a great ignorance of the necessity for proper supervision during the carrying of the child and of the need for pre-arrangement against the time of its birth in the way of securing surgical environment for the labour. A study of the deaths shows that the greater proportion can be prevented by the vigorous application of the principles of modern surgery. The remedy lies in nothing less than a radical change in the conception of midwifery and a complete revision of the attitude of thought that dominates the teaching of the art.

Dr. Eardley Holland is right in stating that the teaching of, and the attendance upon, the diseases of the new-born child is the province of the physician and not of the obstetrician.

Dr. HERBERT WILLIAMSON.

What type of education produces the most competent medical practitioner? Two systems are in vogue at the present time. The first instructs the undergraduate mainly by lecture-demonstrations, systematic lectures, laboratory work and tutorial classes. In the second system clinical work is paramount, and after passing his examination in anatomy and physiology, the student is taught at the bedside of the patient; he personally examines the patient, keeps the records of the case and is made to assume a certain responsibility for the investigation, the diagnosis and the treatment of the patient. Clinical work is the foundation and the keystone of his education. I believe that the latter system produces the better man and that we should therefore hold firmly to it.

Looking back after seventeen years' experience as a teacher and five years as examiner, I see what appear to me defects and weak spots in our curriculum. In the first place, the majority of teachers of clinical subjects have to earn their living by the practice of their profession outside the hospital and are compelled strictly to limit the hours they devote to hospital work and teaching. It is almost impossible for them to devote much time to research, or even keep abreast of the researches of others, and they have none of the leisure which is essential to those who aim at the highest kind of teaching. The only remedy I see for this defect is the adequate endowment of clinical teaching.

A second weak spot is the haphazard way in which the student is allowed to conduct his midwifery cases. In my opinion a lying-in ward forms a necessary part of the equipment of every medical school, and no student should be allowed to take cases on the extern district until he has clerked for a month in that ward and has personally conducted at least five cases under the immediate supervision of a competent instructor. This instructor should be a qualified man or woman who knows the subject well and knows how to teach; the teaching should not be left to a midwife. The subject of obstetrics is essentially a branch of preventive medicine; most of the disasters which still unfortunately attend its practice are preventable, and for this reason the pre-maternity work upon which Dr. Fairbairn has rightly laid so much stress should form part of the teaching of every student.

The next thing that strikes me as wrong is the examination system; it cramps education and is injurious both to the teacher and to the student. The time devoted to the study of obstetrics is short, and the teacher has to meet the requirements of examining Boards and is not free to consider solely the educational value of his teaching. It acts injuriously upon the student, who is too apt to base his work entirely upon examination requirements and is unwilling to devote time and attention to matters of great importance which are not of direct value to him in the examination room. The principle of determining a man's fitness to practise obstetrics simply upon one examination paper and a twenty minutes' viva voce examination is altogether wrong. Students ought to be examined by their own teachers, possibly in the presence of an assessor, and the granting or withholding of the licence should depend largely upon the way in which he has done his clinical work and upon the opinion formed of him by those who have watched his work week by week and month by month.

The last defect to which I shall draw attention is perhaps the gravest defect of all. Every student should be brought up in an atmosphere of research, and in our medical schools this is too often lacking. Research is the very soul of medical education: the spirit of doubt, the spirit of observation, the spirit of inquiry, constitute the atmosphere in which the student should live and move and have his being. This research, this true education, can be cultivated in a small ward; it does not demand a large institution, and the degree in which it obtains in any institution is the measure of the education value of that institution. Let every student during his clerkship be encouraged to look up original papers upon some point, let him see for himself the process by which the statement of some particular point in his text-book was arrived at, let him see the art and science of obstetrics in the making. Then let him be encouraged to work out some particular point for himself. Teach him to observe, teach him to think, then you have laid the foundation truly and well.

Dr. Lapthorn Smith.

My long experience as a teacher has convinced me that the best place to teach gynæcology is in the out-patient department of the hospitals, because there alone would the student see the kind of case that he would meet with in practice. But attendance at the subsequent operation, if one is necessary, would greatly increase the knowledge gained in the outdoor clinic. It is equally important that the students should be taken to the wards to learn the after-treatment. With regard to obstetrics, which in many countries is under the direction of the professor of gynæcology, I have always felt that London should be the greatest centre in the world for teaching it. But the enormous amount of material for teaching is made very little use of, so that it is frequently said that the young doctor goes out to begin practice with very little experience in that department which will form the bulk of his work. As several speakers have pointed out, there is room for improvement in the way of reducing the still large number of deaths from puerperal fever and eclampsia, and it is to be hoped that the pre-natal and post-natal clinics being started all over the country will not only save many mothers, but many more children. There should be a great Rotunda Hospital for London, with several branches, where thousands of poor women could be delivered under skilled and aseptic surroundings who would otherwise be confined at home under most unfavourable conditions. In time private rooms should be available for the rich, the revenue from this source as well as from the middle class, and even a little from the poor, would go a long way towards making these institutions self-supporting. The deficit could be made up by bequests and donations. The master would perform the deliveries in the day time, and the assistant would attend to those taking place at night, but each delivery would be carried out in the theatre under anæsthesia so that every student in a few months would have been present at a hundred cases instead of at half a dozen, and would have had the opportunity of observing the methods of the very ablest exponents of the art. Each medical school might in turn be responsible for the service under the supervision of the master, who would be elected by all the schools, for three or five years. His reward would be a large consulting practice.

Lady BARRETT, C.B.E.

The two most distinct features of the debate have been Dr. Fairbairn's paper calling attention to the need of the teaching of the preventive side in obstetrics and gynæcology, and Dr. Blacker's plea for a whole time professor in the subject whose chief work in life is teaching. Might not, however, some immediate influence be brought to bear upon the students now in our schools by reform in the examination regulations, or rather in the demand made upon students as to work performed before they are allowed to present themselves for examination? I would also suggest that the student might be afforded practical acquaintance with the preventive side of our subject as well as the more modern type of work by allotting part of the time devoted to obstetrics and gynæcology to pathological work associated with the subject. I should like to see regulations passed that no student might present him- or herself for examination in this combined subject without at least a six months' course—three months in gynæcology, including in-patient and out-patient work and attendance at infant clinics, one month in the wards of a lying-in hospital and one month in the outpatient district of the hospital and one month in the obstetrical pathological department—the student at the same time to attend the antenatal and infant clinics throughout the whole three months. This would at least be the first step towards improvement on the present slight demand in midwifery, viz., the attendance at twenty cases.

Dr. R. W. JOHNSTONE (Edinburgh).

I was a little disappointed that the earlier speakers confined their remarks so largely to the special difficulties of the London schools, because I am most immediately interested in obstetric teaching in Edinburgh, and the wider aspects of the subject under discussion are applicable to all schools. I was not aware, until I listened to some of the speakers to-night, how much was apparently lacking in the teaching of obstetrics and gynæcology in London; and I was beginning to think that we managed these things better north of the Tweed, when Mr. Bonney disillusioned me by indicating statistics for Scotland of the maternal mortality following childbirth. Still in some ways we are more fortunate in Scotland. For one thing, the Scottish schools have grown up under the tradition of the systematic lecture, and while I am not prepared to maintain that a six months' course of systematic lectures on midwifery is either necessary or desirable, I am still less prepared to agree that systematic lectures can be abolished and the subject better taught by clinical meetings and demonstrations only. In Edinburgh, and in the other Scottish universities as far as I know, the student has a full six months' course of midwifery and gynæcology lectures. During that period he has the opportunity of attending daily cliniques at the Maternity Hospital, for one month, where he conducts one or two cases of labour under the supervision of the teacher or the house surgeon before going out into the district for his practical experience. Similarly he attends the gynæcological wards of the infirmary for a month, where he is taught practically how to examine a gynæcological case, and sees the ordinary minor and major operative work.

Previous speakers have justly emphasized the great value of clinical teaching being given by the senior teachers, who have the greatest experience. In Edinburgh this is customary. I would also enter a plea for more attention being devoted to the minor cases, which after all form the greater part of the gynæcological work with which the student will meet in actual practice. Too much attention is apt to be paid to tumours and the more interesting cases from the operative point of view. The same thing applies to midwifery. One or two cases adequately taught and demonstrated may be of more value, even if they be normal cases, than less adequate teaching on a large variety of pathological cases.

I do not agree with Dr. Blacker's advocacy of whole-time teachers, at least not for the teaching of undergraduates. In the first place it is not to be expected that the salaries offered would attract the best type of man, and in the second place there is the danger that such a teacher would in the long run become so immersed in hospital methods and the hospital point of view, that his teaching would not be best adapted to the conditions of general practice.

Dr. T. G. Wilson (Adelaide, South Australia).

As an Australian graduate I have often remarked on the fact that graduates and students of Australian universities, who very frequently proceed overseas for further experience before commencing practice, though they generally come to London to do surgery, medicine, pathology, &c., almost always plan to go to other places to do obstetrics—to the United States, to work at the Johns Hopkins Hospital or the Sloane Maternity Hospital; to Ireland, to work at the Rotunda or Croom Hospitals, or to the Continent—before the war especially, to Vienna or Paris. As a teacher on these two subjects I have often been asked to advise old students as to what they should do in their post-graduate courses. Naturally it cannot be that there is any lack of clinical material in London, or that the recognized teachers in the London schools are not on a par with those in other places. What, then, is the difference in the teaching of obstetrics in London generally and in some of these other schools? Dr. Blacker indicated some of these differences, and the main one is that in these other schools the actual clinical teaching of obstetrics is given by more experienced men, who, for the time being at any rate, are whole time men and willing and able to give up their whole time to the instruction of students. The actual delivery of the bulk of ordinary obstetric cases in many of the London hospitals is done by the house surgeons—men who have just qualified, and who are themselves getting practical experience in this work, or in the extern departments especially, often by midwives.

In a school like the Johns Hopkins, on the other hand, this work is done largely by qualified men who are in process of being trained to be specialists in this branch. The same applies to a hospital like the Allgemeines Krankenhaus in Vienna—to the Sloane Maternity Hospital in New York, or to the Rotunda Hospital in Dublin. At the Johns Hopkins Hospital the assistants are men who have done a year or more as general house surgeons or house physicians, and have then taken up gynæcology and obstetrics as a speciality—starting as fourth, fifth, or sixth assistant in the clinic, and working their way right up through all the departments, and definitely spending four or five years at this work. During this time they are for six months to a year definitely detailed to the pathological and research department of this speciality, and when they reach the position of first assistant, are fully competent specialists, and generally apply for a teaching appointment in one of the smaller universities. During this term of training they are adequately paid, and are not doing private practice, and consequently can devote the whole of their time to the actual hospital work and teaching. The students and attending graduates who come under them naturally have the advantage of their greater experience, and even though these students do not get actual demonstrations from the honoraries or heads of the clinic (except in special cases) they have the immense advantage of being taught by far more experienced teachers than the ordinary house surgeon, who is very often doing obstetric manipulations for the first time himself. The question as to whether the teaching hospital is one large one or a number of smaller ones is of less importance than the actual type of teaching personnel in the hospital.

The procedure outlined definitely seems to serve the double purpose of providing better opportunities of being taught practically in ordinary obstetrics for the ordinary pass student, and also of providing a thorough and systematic training for those men who intend to take up this particular speciality in their after life. Naturally I am speaking only of the actual teaching of practical obstetrics, and not of the systematic course of lectures on this subject.

The amount of clinical material at the various special hospitals for diseases of women in London, as has been emphasized by Dr. Eden, is enormous, and it has often struck me how little this is utilized for teaching purposes. If it were possible for all students to have a period as house surgeons or clinical assistants at one of these hospitals, it would be a great thing for the future general practitioner, but as this is not practicable, it seems that the next best thing might be obtained by some such method of ensuring more experienced teachers for the students in the conduct of the ordinary obstetric cases. And if some such procedure can be carried out in the proposed amalgamation of the Queen Charlotte and Samaritan Hospitals as a teaching school for obstetrics and gynæcology, it may be a boon for the future London medical students and general practitioners, whose work in private practice is after all largely made up of ordinary obstetric work and its complications.

Dr. H. R. Andrews.

I fully agree with the general proposition that obstetrics and gynæcology must be taught together: a gynæcologist is inadequately equipped if he has not had a thorough training in obstetrics. Many "interesting" gynæcological specimens have been exhibited which would have remained fairly harmless parts of the patient's body while she was increasing the size of her family if her attendant had been an obstetrician as well as an operator.

Old-fashioned, set, formal lectures are not of great value except to advanced or post-graduate students, but courses of lectures as informal, chatty, suggestive and practical as may be, are of considerable value, especially if the students attending them will do some reading between the lectures.

The old method of learning practical midwifery, entirely or almost entirely in the patients' own homes, has one advantage—viz., that of teaching the student something of "responsibility" and self-reliance, but in many cases he was not ready for responsibility and had no solid ground-work on which to base self-reliance. This advantage was overwhelmingly outweighed by many disadvantages. Some men got into slipshod, haphazard, trust-to-luck ways as the result of want of knowledge and want of supervision, and kept to these ways throughout their practice in after life. A student must be drilled into conducting labour on modern lines, investigating each case as thoroughly as any medical or surgical case, and suiting his treatment to the individual case instead of going simply on general principles; and he must be taught what rigid asepsis means. He will learn a good deal about the puerperium and about the baby in the ward which he could not pick up for himself on the district unless he was an exceptional man and an unusually keen observer. When he has learnt that it is disgraceful to be slipshod and careless he will never relapse completely, if he is worthy to be a doctor. One of the most important lessons which he will learn is that, having found that all is well, even if progress is slow, his duty is to "stand by." When he has finished his training in the ward he is fit to go out on the district, and is ready to profit greatly by his experience there.

I agree with Dr. Lovell Drage that "the medical profession prevents to a considerable extent the loss among the unfit," but a thing which distresses me every month, if not every week, at the

London Hospital is that the medical profession does not prevent a large unnecessary loss among the fit. The only way to prevent this unnecessary loss is by improving the teaching of midwifery. There is one sentence in Dr. Lovell Drage's paper which must not be allowed to pass uncriticized: "It does not appear that there is any reason to suppose that the supervision of pregnant mothers will produce any other result than that of raising up to maturity more unfit adults." I suspect that Dr. Lovell Drage meant to exaggerate, and knew that he was exaggerating, but, to my mind, he has gone much too far. Take the first two examples that occur to one—maternal syphilis and minor degrees of contracted pelvis. Supervision of pregnant mothers may result in the production of A 1 citizens in either of these two conditions. French authorities stated many years ago that thorough treatment of babies with congenital syphilis resulted in their being as good in every way as children who had not had syphilis, and I do not believe that Dr. Lovell Drage or anyone else has any evidence to show that children of syphilitic mothers who were adequately treated by more modern methods during pregnancy suffer any ill-effects in after life. If minor degrees of pelvic contraction are discovered only during labour the result is often that the mother is badly torn and the child dead or damaged. If, on the other hand, the mother is admitted into a lying-in institution because the contraction was discovered before labour, in the large majority of cases she will be undamaged and the baby will be born alive and well, either after induction of premature labour or by the exercise of patience and masterly inactivity which characterize the management of labour by a whole time medical officer who is always available. The general practitioner, in far too many cases, cannot give up the time necessary for watching the course of labour for many hours as would be done in a hospital, and terminates the labour by forcible traction with disastrous results. I consider that an ante-natal department is an essential part of the equipment of a modern teaching hospital.

Dr. W. S. A. GRIFFITH (in reply).

I am sure that the discussion will be of great value in stimulating all who are responsible for the teaching of these subjects to press for the improvements which have been suggested and so generally approved.

I hope visitors and others present who are not conversant with the excellent instruction afforded in London will not accept the condemnatory statements of certain distinguished teachers as entirely justified. It is inconceivable that they who are responsible for these departments in their medical schools could allow them to be so completely unorganized.

Mr. Victor Bonney's argument based on a continued 0·5 per cent. maternal mortality is hardly fair, when it is realized that two-thirds of midwifery practice is in the hands of midwives, and that there are still in practice a considerable number of senior practitioners who have not received the advantages of modern training, and for whom the present teachers are not responsible.

The most important suggestion made is one to which most teachers will agree—namely, the establishment of a central maternity and gynæcological hospital in the principal teaching centres, thoroughly equipped with laboratories for pathology and research, under the control of a professor or director, adequately remunerated, whose whole time should be devoted to his work, with the necessary assistants, and, as Sir Walter Fletcher has suggested, associated with an expert physiologist to link up the teaching as well as the investigation of problems which are at present carried out in widely separated institutions.

The development of infant welfare schemes, which Dr. Fairbairn so strongly advocated, is one which each maternity department and hospital can do much to carry out, and will prove of great value.

Section of Obstetrics and Gynæcology.

President—Mr. J. D. MALCOLM, C.M.

The Continued High Maternal Mortality of Child-bearing: The Reason and the Remedy.[1]

By VICTOR BONNEY, M.S.Lond., F.R.C.S.Eng.

SOME STATISTICS.

THE yearly reports of the Registrar-General for England and Wales show that the death-rate directly and indirectly attaching to pregnancy and labour has diminished woefully little in the last seventy years.

ENGLAND AND WALES.

Year	Births	Deaths attaching to childbirth	Proportion per 1,000 live births	Deaths by sepsis	Proportion of deaths by sepsis per 1,000 births	Proportion of deaths by sepsis to total deaths Per cent.
1917	668,346	3,236	4·8	916	1·3	28
1916	785,520	3,978	5·0	1,147	1·4	28
1915	814,614	4,259	5·2	1,253	1·5	29
1914	879,096	4,498	5·1	1,422	1·6	31
1913	881,890	4,295	4·8	1,173	1·3	27
1912	872,737	4,321	4·9	1,280	1·4	28
1911	881,138	4,322	4·9	1,334	1·5	30
1910	896,962	4,277	4·7	1,274	1·4	29
1909	914,472	4,600	5·0	1,429	1·5	31
1908	940,383	4,521	4·8	1,395	1·4	30
1907	918,042	4,672	5·0	1,465	1·5	31
1906	935,681	4,944	5·2	1,640	1·7	33
1905	929,293	5,164	5·5	1,734	1·8	33
1902	940,509	4,205	4·4	2,003	2·1	47
1892	897,957	5,194	5·7	2,356	2·6	45
1880	881,643	3,492	4·0	1,659	1·8	47
1870	792,787	3,875	4·9	1,492	2·8	38
1860	684,048	3,173	4·6	978	1·4	31
1859	689,881	3,173	5·1	1,238	1·8	39
1858	655,481	3,131	4·8	1,068	1·6	34
1857	663,071	2,787	4·2	836	1·2	30
1856	657,453	2,888	4·4	1,067	1·6	37
1855	635,043	2,979	4·7	1,079	1·7	36
1854	634,405	3,009	4·7	954	1·5	31
1853	612,391	3,063	5·0	795	1·3	26
1852	624,012	3,247	5·2	972	1·5	30
1851	615,865	3,290	5·3	1,004	1·6	30
1850	593,422	3,252	5·5	1,113	1·8	34
1849	578,159	3,339	5·8	1,165	2·0	35
1848	563,059	3,445	6·0	1,365	2·4	39

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[1] At a meeting of the Section, held May 1, 1919.

The ratio between the number of deaths directly due to pregnancy and labour, and those returned as merely associated with pregnancy and labour may be exemplified by the returns of the Registrar-General for England and Wales for the five years 1911 to 1915.

Thus in 1911 there were 3,413 "direct" deaths, or 3·87 per 1,000 births, and 909 "indirect" deaths, making a total of 4,322 deaths "direct" or "indirect," or 4·91 per 1,000 births.

In 1912 there were 3,473 "direct" deaths, or 3·98 per 1,000 births, and 848 "indirect" deaths, making a total of 4,321 "direct" and "indirect" deaths, or 4·95 per 1,000 births.

In 1913 there were 3,492 "direct" deaths, or 3·96 per 1,000 births, and 803 "indirect" deaths, making a total of 4,295 "direct" and "indirect" deaths, or 4·87 per 1,000 births.

In 1914 there were 3,667 "direct" deaths, or 4·17 per 1,000 births, and 831 "indirect" deaths, making a total of 4,498 "direct" and "indirect" deaths, or 5·12 per 1,000 births.

In 1915 there were 3,400 "direct" deaths or 4·18 per 1,000 births, and 881 "indirect" deaths, making a total of 4,259 "direct" and "indirect" deaths, or 5·27 per 1,000 births.

It is to be noted that the ratio is between the number of maternal deaths and the number of live births and not the number of labours or pregnancies.

The Scottish statistics are as follows :—

SCOTLAND.

Year	Births	Deaths attaching to childbirth	Proportion per 1,000 live births	Deaths by sepsis	Proportion of deaths by sepsis per 1,000 births	Proportion of deaths by sepsis to total deaths Per cent.
1915	114,181	698	6·1	262	2·3	37
1914	123,924	746	6·0	288	2·3	38
1913	120,516	708	5·9	201	1·6	29
1912	122,790	675	5·5	231	1·9	34
1911	121,850	699	5·7	214	1·7	30
1910	124,059	710	5·7	229	1·8	32
1909	128 669	699	5·7	214	1·7	30
1908	131,362	676	5·1	241	1·8	35
1907	128,840	686	5·3	235	1·8	34
1906	132,005	717	5·4	275	2·0	38
1880	124,570	620	4·9	204	1·6	33
1870	115,390	583	5·0	202	1·7	34
1864	112,333	628	5·5	254	2·2	40
1863	109,341	571	5·2	195	1·8	34
1862	107,069	435	4·0	130	1·2	30
1861	107,009	511	4·7	203	1·9	39
1860	105,629	564	5·3	236	2·2	41

Those are disappointing figures, though they cannot be taken entirely at their face value, first because a somewhat different method of computation has been adopted of recent as compared with more remote years, and secondly because there has undoubtedly been, over the period under consideration, a progressive improvement in the thoroughness and accuracy with which certification has been carried out.

Thus for some years past, deaths certified as *directly due* to pregnancy and labour have been classified separately from those certified as *merely associated* with pregnancy and labour, whereas before the "direct" and "indirect" deaths were all included together. Moreover, in recent years, deaths from certain diseases, not previously held to be the direct outcome of pregnancy, such as pregnancy nephritis without eclampsia, have been included under the head of deaths directly due to pregnancy.

These amendments in the method of computation and the improvement which has probably taken place in the accuracy of certification operate unfavourably towards the figures of recent years.

The excessive maternal mortality from child-bearing in the United Kingdom and its scanty diminution was forcibly commented on by Sir A. Newsholme in a report on the subject in 1915.[1] He therein showed that a high maternal mortality is associated with a corresponding increase in the number of stillbirths and of infant deaths in the early weeks after birth. He gives the following figures:—

In England the present average is 1 maternal death for every 250 registered births
In Ireland ,, ,, ,, 1 ,, ,, ,, 191 ,, ,,
In Wales ,, ,, ,, 1 ,, ,, ,, 179 ,, ,,
In Scotland ,, ,, ,, 1 ,, ,, ,, 175 ,, ,,

and states that "on general grounds there can be no reasonable doubt that the quality and availability of skilled assistance before, during, and after childbirth are probably the most important factors in determining the remarkable and serious differences in respect of mortality in different districts."

The following tables are also given by him:—

DEATH-RATES PER 1,000 BIRTHS FROM PUERPERAL SEPSIS.

Years	England	Wales (including Monmouth)	Scotland	Ireland
1881—1890	2·56	3·11	2·42	2·83
1891—1900	2·22	2·99	2·01	2·62
1901—1902	2·10	3·24	2·29	2·22
1903—1910	1·62	2·05	1·93	2·04
1911—1914	1·39	1·67	1·44	2·01

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[1] A Report on Maternal Mortality in connexion with Child-bearing: Forty-fourth Annual Report, Local Government Board, 1914-15.

DEATH-RATES PER 1,000 BIRTHS FROM ACCIDENT AND DISEASES OF CHILD-BEARING OTHER THAN SEPSIS.

Years	England	Wales (including Monmouth)	Scotland	Ireland
1881—1890	2·08	2·99	3·03	4·24
1891—1900	2·74	3·95	2·71	3·98
1901—1902	2·33	3·65	2·66	3·99
1903—1910	2·13	3·21	2·37	3·41
1911—1914	2·47	3·91	4·26	3·19

from which it will be seen that though some diminution has occurred in the mortality due to puerperal sepsis, in England particularly, yet the mortality due to diseases and accidents of child-bearing other than sepsis has, except in the case of Ireland, risen appreciably.

He further gives the following table dealing with the total death-rates in different periods of years:—

TOTAL DEATH-RATES PER 1,000 BIRTHS FROM ALL CAUSES.

Years	England	Wales (including Monmouth)	Scotland	Ireland
1881—1890	4·64	6·10	5·45	7·07
1891—1900	4·96	6·94	4·72	6·60
1901—1902	4·43	6·89	4·95	6·21
1903—1910	3·75	5·26	5·30	5·45
1911—1914	3·86	5·58	5·70	5·20

from which it appears that comparing the period 1881-90 with 1911-14, the total mortality has declined 17 per cent. in England, 9 per cent. in Wales, and 26 per cent. in Ireland, whilst in Scotland it has remained much about the same.

Now whichever way these figures are viewed they are thoroughly unsatisfactory, for they show that over a period during which enormous advances have taken place in every other branch of our profession, obstetrics alone, as judged by its results, has advanced very little. Something is wrong somewhere, and this applies not only to British obstetrics but to obstetrics all over the civilized world.

In a very exhaustive and important report by Dr. Grace Meigs, of the Department of Labour of the United States of America,[1] it is shown that during the twenty-three years ending 1913, no definite decrease in the death-rate of child-bearing can be demonstrated in the death registration area of the United States.

Further it is shown from a study of the death-rates of fifteen foreign countries, that only five of them—England and Wales, Ireland, Japan,

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[1] "Maternal Mortality from all Conditions connected with Childbirth in the United States and certain other Countries," 1917.

New Zealand and Switzerland—have effected any diminution in the mortality of child-bearing in recent years, and of these, England and Wales, and Ireland, are the only countries which show a falling off in the percentage of deaths due to puerperal sepsis.

It is to be remembered that of the total deaths an undue proportion follow first pregnancies and labours, because puerperal sepsis and pregnancy toxæmia, which as we shall see are the two chief causes of death, are conditions which specially afflict women bearing children for the first time. The death risk of these, therefore, is considerably greater than the general averages given.

THE CHIEF CAUSES OF DEATH.

What are the chief causes of death directly due to pregnancy and labour? A perusal of the English and Welsh figures for 1912, 1913, 1914 and 1915, which may be taken as characteristic of all years, show that in importance they rank as follows:—

(1) Sepsis, including phlebitis.

(2) Pregnancy toxæmia, including nephritis, eclampsia and vomiting.

(3) Hæmorrhage, either before, during, or after labour.

(4) Embolism and other causes of sudden death.

The numbers of deaths due to these causes in the years named are as follows:—

	1912	1913	1914	1915
Total deaths directly due to pregnancy and labour	3,473	3,492	3,667	3,408
Deaths from—				
Sepsis	1,280	1,173	1,422	1,253
Pregnancy toxæmia	662	797	787	663
Hæmorrhage	610	616	595	556
Embolism and sudden death	298	267	275	242

Sepsis.—Puerperal sepsis, including under that term septicæmia, pyæmia, phlebitis and all its other manifestations, is thus seen to be still by far the commonest cause of death. The figures would probably be higher still did they include every case in which bacterial infection of the birth canal determined the fatal issue. For in the tables of deaths not directly due to, but associated with, pregnancy it is seen that pneumonia and influenza figure largely, a suspicious circumstance, seeing how often pneumonia is the most striking feature of puerperal sepsis and how frequently in septic cases the mistaken diagnosis of influenza is made. Moreover surgical experience has shown that embolism after operations is probably in most cases due to slight sepsis; for if the charts of patients thus dying be examined it will usually be found that the temperature has been slightly abnormal for some days preceding the catastrophe. Further the frequency of sudden death after operations by embolism has diminished of recent years concurrently with the improvement in rapidity and smoothness of convalescence which modern surgical technique has achieved. Septic infection of the wounds caused by labour will probably never be entirely abrogated because in a certain proportion of the cases the process is one of auto-infection. Nevertheless in by far the greater number the infection is carried into the birth canal by fingers or instruments, a largely preventable occurrence. During the ten years 1906 to 1915 the mortality from septic infection in England and Wales has remained very nearly constant, but with a slight tendency to fall. In Scotland, however, although the material difference is small, the figures indicate a slight tendency to rise. Comparing the years between 1870 and 1902 with those between 1906 and 1915 we find, however, that in England and Wales there has been some improvement. Thus the mortality due to sepsis per 1,000 births was:—

In 1902	2·1 per 1,000
In 1892	2·6 ,,
In 1880	1·8 ,,
In 1870	2·8 ,,

whereas in the ten years, 1906 to 1915, it never exceeded 1·7 per 1,000 for any one year.

The year 1870 brings us back to the initiation of "Listerism," and one would naturally suppose that in the years prior to this great event the mortality from puerperal sepsis would be found to be considerably higher than in the years after it. But—and this is a very striking circumstance—the Registrarial figures show nothing of the kind: on the contrary, in the year 1860, the death-rate from sepsis is returned at 1·4 per 1,000 births, a figure as low as any of those of recent years, except 1913, when it was 1·3. No doubt it may be argued, and with justice, that in these earlier times certification was much less accurately carried out than nowadays, and that, in all probability, many deaths really caused by puerperal septic infection were not recognized as being due to such. But after every excuse has been made and every explanation offered in the attempt to adjust to our satisfaction these jarring figures the uncomfortable question still suggests itself: Have we so much improved on the practice of pre-Listerian days that we have a right to expect greatly improved results?

It is true that devastating epidemics of puerperal septicæmia no longer ravage our lying-in hospitals, and that from being the most dangerous places for labour to take place in they are now become the safest. But, after all, the number of women confined each year in lying-in hospitals forms such a trivial proportion of the yearly total of confinements in the country at large, that even so great a reduction in the institutional death-rate as has been accomplished in the last forty years would not distinctly affect the death-rate of labour in general. The diminution that has been effected in the death-rate of institution-conducted labour has been so dramatic that it has obscured the wider issue, and most of us if asked whether obstetric practice had not greatly improved in the last forty years, would, thinking in terms of the lying-in hospital, have returned an emphatic affirmative. But the hard figures dispel this comfortable illusion. They show that the great wave of progress initiated by Lister and swelled by the host of workers in surgery treading after him, has passed over obstetric art and left it not greatly changed.

Taking the conduct of labour in general, not much more than a bowl of antiseptic lotion stands between the practice of to-day and the practice of the sixties. But a bowl of antiseptic lotion is not Listerism, though it was misconceived as such by many of the older surgeons in the seventies and early eighties, and apparently, with the addition of rubber gloves, is still misconceived as such by many obstetricians up to the present day. The principle of antiseptic surgery as conceived by its great founder was the creation of aseptic conditions; in the wound primarily, and therefore as a corollary in all that surrounded or touched the wound. Now the problem of how to achieve such conditions is an exceedingly difficult one, even as regards those regions of the body most favourable for its accomplishment; and most of all difficult in connexion with labour; and yet the immense amount of thought and endeavour that has been expended on the effective application of the antiseptic principle as far as recognized surgery is concerned, stands in marked contrast to the apathy on the subject which distinguishes the practice of obstetrics. One reason for this is that that method of infection of the birth canal wherein septic organisms are conveyed from individual to individual has received disproportionate attention, probably because it is the most obvious and was responsible for the striking epidemics that afflicted lying-in hospitals in the past. But even in those days by far the larger proportion of the cases of puerperal sepsis were probably due, as they are now, to infection by the bowel organisms of the patient herself. For special conditions of propinquity and rapid carriage are necessary for infection from extrinsic sources and such only obtain in the minority of labours. The problem of preventing extrinsic infection moreover is relatively simple as compared with the prevention of infection from intrinsic sources—for example, the wearing of sterile-rubber gloves practically renders impossible the conveyance via the attendants' hands, of organisms from one patient to another, but it in no way diminishes the possibility of the carriage of anal organisms into the vagina. Thus, although the antiseptic measures employed in lying-in hospitals fall far short of those in use in general surgery they have sufficed practically to abolish extrinsic infection, in spite of the fact that the first requisite for its extensive occurrence, the collection of a number of patients under one roof, remains as before. But intrinsic infection producing more or less pyrexia is quite common still. The symptoms are rarely severe, however, for the infection is probably considerably modified by the antiseptic measures taken and moreover the cases are promptly treated. In home-conducted labour, on the other hand, in which extrinsic infection was probably always a subordinate cause of puerperal sepsis, the adoption of antiseptic measures on the average considerably less thorough than those employed in lying-in hospitals, though potent to a certain extent against extrinsic infection, has had little effect on the far commoner intrinsic infection, against the occurrence of which nothing less than a most elaborate antiseptic technique will suffice.

Besides the immediate loss by death of a number of fertile women each year, the scarcely diminished prevalence of puerperal sepsis is of national importance on account of the far greater number of cases of acute illness that it occasions short of death. It is impossible to assess accurately the mortality of the disease in relation to the number of persons attacked because only the worst examples as a rule are officially certified. Taking all cases of severe illness however caused thereby, I believe that a death rate of 20 per cent. would not be far from the mark; that is, that for every one woman that dies, four more are very seriously ill. This morbidity is injurious to the nation in three ways: first, the community is constantly deprived of the working activities of a certain number of its members; secondly, a considerable proportion of these women are rendered sterile by the disease, whilst others are discouraged from further child-bearing; and, thirdly, a certain number of children perish because they have to be withdrawn from the breast.

Pregnancy Toxæmia.—By far the larger number of deaths falling under this head are caused by pregnancy nephritis and eclampsia, pernicious vomiting on the average only accounting for between thirty and forty deaths per annum in England and Wales. There are rare cases of eclampsia in which the onset is absolutely acute and without any premonition whatever, but, in by far the larger number, forewarning signs such as albuminuria, headache or vomiting are present for some considerable time before the onset of the fatal seizure. Most of the deaths from eclampsia are either the result of failure to observe the premonitory signs, or to adopt the right treatment when the condition is obviously declared, and the same applies to the deaths from pernicious vomiting.

Hæmorrhage.—About two-fifths of these deaths are due to placenta prævia, the remainder to other forms of ante-partum hæmorrhage and to post-partum hæmorrhage. Deaths from hæmorrhage in pregnancy and labour are almost entirely preventable. In lying-in hospitals where skilled supervision of labour obtains, practically the only deaths from this cause are those in which the patient is admitted having already lost a great quantity of blood.

Embolism and Sudden Death.—The probable relation of embolism to latent sepsis has already been commented on. Certain of the cases classified under the above head may possibly be due to such disasters as rupture of the uterus, but, beyond all gross physical causes, death from sudden heart failure occurs occasionally after labour, not only in women, but in the lower animals. These deaths from unexplained cardiac failure must be looked upon as unpreventable in the present state of our knowledge.

If it be true then, as it undoubtedly is, that of the number of deaths directly due to pregnancy and labour the greater proportion could be prevented, the scantily diminished yearly mortality constitutes a standing reproach to the community at large and to the medical profession, and in particular to the teachers of obstetrics. The remedy lies in nothing less than a radical change in the conception of midwifery, both by the profession and the public, and a complete revision of the attitude of thought that dominates the teaching and practice of the art.

MIDWIFERY A SURGICAL ART.

Pregnancy is a state induced by the growth of a neoplasm; labour is a process accompanied by self-inflicted wounds, and the puerperium is the period of their healing.

Midwifery concerns itself with the treatment of these three, and is a pure surgical art, for the diseases of the new-born child are the province of the physician.

The product of conception causing hepatic breakdown or renal disease or convulsions or menacing hæmorrhage or pelvic impaction is no less a life-endangering neoplasm than an hydatid cyst, an adrenal tumour, a glioma, a uterine fibroid, or an incarcerated ovarian cyst, and the problem of its treatment is a surgical problem.

Normal unassisted labour is an operation that the patient performs on herself, and should have the environment proper to any other operation that involves a breach of surface. Still more is this necessary in cases in which manipulative interference or operative assistance may be required.

But not Recognized as such.

Unfortunately the conception of midwifery as a department of surgery is still very far from being established. Let us examine the reasons.

Founded on the art of the female midwife, obstetrics is the oldest special branch of our profession, but, unlike the others, it arose not as an offshoot, the result of the exuberant growth of medical knowledge, but more or less as an independent subject, which in process of time became grafted on to the main stem. That that process is not yet complete is shown by the fact that medical art is still divided into three primary divisions — medicine, surgery and midwifery — some examining bodies even granting a separate diploma in the last named subject.

The isolated position of midwifery is early brought to the notice of the medical student. His text-books of physiology do not deal with the function of reproduction; the diseases and disasters of child-bearing receive no mention in the lectures on general pathology; the obstetric curriculum is divorced from the rest of his studies as though the morbid processes with which it concerns itself were fundamentally of a different nature to the rest of disease. He sees in some institutions its exponents, though styled physicians, practising their calling almost entirely by operative means. In the theatre attached to the lying-in wards he witnesses labour conducted with the circumstances of modern surgery, whilst in the extern department he finds the same procedures carried out under conditions which would make any of the operations of recognized surgery unjustifiable. He finds that at the London University the M.D. degree may be taken in obstetrics, and that an essential feature of the examination is a paper, not on surgical pathology, but on general medicine, including tropical medicine!

What wonder, then, if, in the face of all these anomalies and contradictions, a conception of midwifery as a separate art, to which the tenets of surgery only partially apply, grows up within the student, from him passes on to the practitioner, and finally reaches the public.

THE CONSEQUENCES.

The ill-results that follow from this false conception are accentuated by those flowing from another error perpetuated by the foolish reiteration of the word "natural" as applied to child-bearing, without comprehension of all that "natural" implies.

Childbearing *is* a physiological process, but it stands alone amongst such, in that while the rest of them are exercised on behalf of the individual, reproduction occurs for the benefit of the race at the cost of the individual. The toll thus levied on the female is exacted from civilized and uncivilized women alike; animals, whether domesticated or wild, whether high or low in the scale, do not escape it.

The analogy between reproduction and other natural acts has been so much harped upon that the public has come to think little of the dangers of pregnancy and labour, the latter of which, amongst the uneducated classes, is regarded as analogous on a larger scale to defæcation or micturition. These two errors are responsible for maintaining great public ignorance of the necessity for proper supervision during pregnancy and pre-arrangement against the time of labour, and, as a corollary, a disinclination to spend on these events an amount of money commensurate with their importance.

In the practice of recognized surgery the medical man postulates certain surroundings and accessories as a necessity for the successful performance of his work, and without them, except under great emergency, he refuses to undertake the case. Moreover, the public, educated as regards recognized surgery, supplies his requirements without demur, or being unable to do so, appreciates at once the necessity of having the patient transferred to a hospital or home.

But in obstetrics a vicious circle obtains. The want of understanding of the dangers of child-bearing and the "surgicalness" of midwifery results in the public under-rating the requirements of the art. Hence has been established a custom by which childbirth takes place under conditions that sicken the surgical soul. The attitude of the public in turn reacts on the medical man. He finds when he begins practice that it is customary to conduct labour under conditions that he feels to be faulty, but in the face of long usage, he hesitates to undertake the task of changing them.

The conversion of the lying-in room into some semblance of an aseptic operating theatre, efficient assistance, and an independent anæsthetist are looked upon by many as academic ideals—unessential and not to be pressed for in everyday work.

There are still in all great cities numbers of houses unfit for the habitation of human beings. In such surroundings, with insufficient material, scanty light, and inadequate assistance, the difficult operations of obstetric surgery are frequently performed, and no vigorous voice is raised in protest against the custom.

Most of us are familiar with the general surgeon who relates, in tones of proud accomplishment, the occasion when he successfully operated for, say, a strangulated hernia in a dirty cottage by the light of a single candle and the assistance of only the anæsthetist and the village nurse.

But what of the obstetric surgeon, who by evil custom amidst similar surroundings, plays the part of operator and anæsthetist in his single person, not on one exceptional occasion but over and over again in the course of his professional life!

But the absence of the conception of the "surgicalness" of midwifery is by no means limited to the poorer classes. Consider the average lying-in room in the average middle-class house. A double bed, unwieldy and inconvenient, is the first object that strikes the eye. By the side of it stands a commode. In one corner is the baby's cradle, in another is the cast-clothes basket, in the third is the washstand, and upon it toothbrushes, bottles of hand and hair lotion, and the husband's shaving materials. The dressing table absorbs much of the floor of the room and most of the light of the window. It is littered with brushes, combs, hairpins, trays, boxes, photograph frames, wisps of shed hair and such like rubbish; in the midst of which a bowl of antiseptic solution, in which some blobs of white wool have been immersed, stands forlornly. A large wardrobe, three chairs, and a chest of drawers, the top of the latter piled up with books, knicknacks and various odds and ends, obtrude themselves on the already limited space. The mantelpiece exhibits multifarious articles, none of them bearing any reference to the matter in hand except a bottle of Three Star brandy, a feeding cup, and a cleaned soap bowl containing the time-honoured but ridiculous sheaf of threads for tying the cord. Under the dressing-table are several pairs of boots; whilst airing in front of the fire, partly on the fender and partly on the floor, is a heap of baby linen. Amidst these surroundings lies the unfortunate woman on whom a surgical operation, fraught with very definite risks, may presently be required to be performed. Were the nature of it any other than obstetrical the room would not be left in a state of such utter unpreparedness, but would be cleared and converted as far as possible into an impromptu operating theatre.

PREGNANCY CONSIDERED AS AN ABDOMINAL NEOPLASM.

The product of conception is as truly a neoplasm as any other uterine tumour, and should be regarded as such. It differs from the rest of them only in this, that it usually undergoes spontaneous cure. But even in this regard it is not peculiar, for a uterine fibroid may be expelled or be absorbed. It all other respects it is strictly comparable with the other new growths. It may become malignant or be malignant *ab initio*. It may become infected, impacted, or twisted. It may rupture into the peritoneal cavity, or cause pressure symptoms by its size. It may give rise to severe hæmorrhage or undergo pathological changes as a result of which the possessor suffers from acute toxic absorption, and its final expulsion may be accompanied or followed by shock, hæmorrhage or sepsis.

In the present state of our knowledge we have no specific treatment for the results of abnormal pregnancy beyond surgery. When the neoplasm is endangering life, it must be got rid of, and at all times, seeing its potentialities for harm, its possessor must be kept under medical supervision.

It may be said that this is already common obstetric teaching, but it is not. The student is instructed in the diseases and accidents of pregnancy and their appropriate treatment, but the big general principle is *not* taught him: he is taught to see the trees, but not the wood. Nearly all the deaths caused by abnormal pregnancy are due either to lack of medical supervision, whereby the menace of the neoplasm is not discovered until it is too late to save the patient anyhow; or, the danger being discovered, to tardiness in applying the general surgical principle that a life-endangering tumour should be got rid of as soon as possible.

LABOUR CONSIDERED AS AN OPERATION.

Labour, even normal labour, should be considered as an operation. The first requisite for safety, therefore, is asepsis of the operation area, or birth area, as we will call it. The vagina should be regarded as a wound, into which the passage of anything unsterilized, in a fumbling half-sighted manner, and without previous antiseptic preparation of the surrounding skin, is a hideous transgression of the ritual of modern aseptic surgery.

And under the term obstetric operation I would include not merely the more obviously mechanical procedures such as forceps extraction, craniotomy, and so on; but every manual assistance to delivery, even if it run to no more than the hooking down of an arm, a single stitch in the perinæum, or a vaginal examination.

The wearing of boiled rubber gloves during the conduct of labour has become increasingly common of recent years. A layer of rubber between the hand and the patient prevents the transference of organisms from one to the other. So far, so good. But organisms from the patient's skin, or from bed-clothes, furniture, or any other unsterilized surface, are carried as well by the gloved as by the ungloved hand, and it is the organisms from these sources, and particularly the patient's skin, that are, and always have been, the chief agents of puerperal sepsis.

With the anus as a centre there exists a zone over which intestinal organisms are spread with a lessening intensity from centre to periphery. That is the reason why the likelihood of infection of a wound increases the nearer it is to the anus. This was strikingly exhibited, to my own observation, in the wounds in the late war. All must have noticed that when a game bird or hare is hung it is the inner and upper thigh which first becomes " high. Now nature has made the mistake of placing the birth area almost in the middle of this danger zone. The problem set us is how to prevent or minimize the results of this mistake. To prevent the conveyance of organisms from the adjacent skin into the wound, the up-to-date operator in recognized surgery prepares the skin beforehand with powerful antiseptics and further attaches towels or rubber sheeting in such a way as to cut the skin out of the operation area altogether. It is urgent that such principles be applied to labour, for the skin of the ano-perineal region is the most heavily infected of any skin-area in the body. Could we achieve sterilization of the birth area or only relative sterilization, the mortality of childbirth would be nearly halved right away and the morbidity much more than halved.

The recent introduction of the non-irritant yet powerful antiseptics belonging to the aniline group goes far to place at the service of the obstetrician the means of achieving sterility of the birth area. The investigations carried out by Dr. C. Browning and myself, showed that sterilization of the ano-perineal area could be effected by the use of "violet-green," and I have suggested that during labour this antiseptic should be applied by compress to the vulvo-perineal skin until such time as the head is about to be born. Further I think that this antiseptic should be used as a lubricant every time a vaginal examination is made, and before any operative procedure is undertaken within the vagina the canal should be thoroughly swabbed out with it. It has been objected that the baby's head will be stained, but this is a small price to pay for protection against sepsis. Instead of violet-green, flavine can be used, the colour of which is not so aggressive, while it is nearly as powerful an antiseptic.

Such measures would go far towards sterilization of the birth area, but a danger remains—namely, that due to the eversion of the anal canal and the expression of mucus or fæces during the last phase of the second stage. Provided that the lower bowel has been thoroughly emptied beforehand, I conceive it would be possible to insert into the rectum a suppository composed of one of these non-irritant antiseptics sufficient to sterilize a mere escape of rectal mucus.

As however absolute sterility of the anal region will probably never be able to be effected, we must seek to cut the anus out of the birth area. This can be done by fixing over it either by clips or stitches, a large gauze pad soaked in a strong non-irritant antiseptic. It is impossible to fix sterilized towels round the orifice of the vagina in the same way as they are fixed to the edges of an operation wound.

Having created a state of asepsis in the birth area, the next point is to keep it aseptic. This is attained by rendering sterile all that is to come in contact with the birth area and all that environs it. The problem is simple compared with that which we have just considered, for we have only to copy the ordinary arrangements of a modern operating theatre. The lying-in chamber should be cleared as in preparation for a surgical operation. All maternity nurses should be thus instructed. At the present time not one in fifty does so. This is partly due to want of teaching, and partly to the ignorance of the patient and her relatives who object to the removal of the bedroom trumpery. This is a matter for education. The obstetrician must, of course, be gowned and gloved as befits a surgeon engaged in an operative procedure, in which the avoidance of sepsis is all-important. At a cost of less than a sovereign a tin containing a complete outfit of sterilized gowns, towels swabs and gauze can now be obtained. The day will come, I hope, when public opinion will cause them to be at the free service of the poor. Without such an outfit the aseptic conduct of labour is impossible, and the layman, niggardly of all expenditure where childbirth is concerned, must be made to realize that no money is ever better spent.

And still considering labour as a surgical operation I now pass to another necessity for its proper conduct: the birth area must be *accessible*. In the second stage of labour the side posture is that always adopted in this country but it is a bad one; for it gives a poor exposure of the parts for purposes of sight and touch, and, by placing the anus nearest to the attendant renders more likely the conveyance of bowel organisms into the vagina. For all operative purposes, except Cæsarean section, even for examination only, the lithotomy position is the proper one. If the patient is not anæsthetized she should be placed across the bed with her feet on a couple of chairs or rests. But when under an anæsthetic she should be secured by Clover's crutch or the leg rests of an operating table. The idea of a surgeon performing curettage or ligaturing piles without an anæsthetist is admittedly ridiculous, but in obstetric work the practitioner, still to this day, is frequently diffident of asking for such assistance, because by custom the public expects him to combine the offices. Now an absolute necessity, in the problem of how to render aseptic the technique of assisted labour, is an independent anæsthetist. Even where the anæsthetic is to be administered merely for the sake of relieving the patient's sufferings during the last phases of the second stage it should not be given by the obstetrician, for at any minute it may be necessary for him to turn his attention to the birth area. Equally faulty is the practice of the nurse acting as administrator and leaving the medical man to manage the delivery unassisted. Both these methods are irreconcilable with an aseptic technique even in a straightforward case, whilst in circumstances of difficulty or emergency the result is hopeless chaos. Further it is impossible for the obstetrician to guard his gloved hands against contamination, unless he has besides the anæsthetist, efficient assistance. For the proper conduct of assisted or operative delivery four persons are required—the operator, the anæsthetist, the two assistants, one or both of whom may be nurses, provided they are properly trained. Finally, we have to consider the action of the obstetric surgeon himself and the principles that we, as obstetric teachers, need to impress upon him.

Given that every factor in the labour is normal, the safest method of delivery is self-delivery free of any interference with the birth canal whatever. Patients deploring the fact that the child was born before the arrival of the attendant have sometimes reason to bless their good fortune instead. Every manipulation within the birth canal, even the single examination to determine the position of the presenting part, carries with it a definite risk of conveying sepsis, which must be balanced against the advantages of the interference. This does not imply that there is no possibility of sepsis after absolute self-delivery. Sepsis by auto-infection may, and does, occasionally follow such labours, but it is rare. It follows, therefore, that interference in labour should never be undertaken needlessly. But—and this is the point so essential to be taught—when interference is necessary, either on account of obvious abnormality, or doubt as to the exact state of affairs, it must be carried out with *surgical thoroughness.* More harm has been done by single, slovenly, internal examinations than by all the deliberate set operations of obstetrics put together.

And, setting aside for the moment interference on account of obvious abnormality, the teaching should emphasize the importance in obstetric work of *being sure;* for of all departments of surgery there is none in which cardinal decisions have to be reached and acted upon so quickly. A mistake in judgment results in untoward happenings, at the best to be palliated but never entirely to be rectified. Such mistakes will of course at times occur, even with the utmost precaution, for no one is infallible. There are, however, two axioms that should be instilled into the student's mind in this connexion.

The first is that a plan of action decided on and carried out in a determined, thorough, and surgical manner, even though it be not the best suited to the conditions of the case is better than wavering measures, conceived in uncertainty, and performed in a timid and unsurgical way.

The second is, that when it is realized that a mistake in judgment has been made, that course should be immediately adopted which most surely minimizes its ill results to the patient. And in this matter I hold very strongly that the safety and well-being of the mother is the obstetrician's chief concern in all cases, and in difficult labour his sole concern. I mean, that if two courses are open to him, both of equal risk to the mother, but one having a lesser risk to the child, he should choose that one, but in every other case he should choose that which is best for the mother. For in labour it is not only the patient's life that has to be preserved, but her health and her capacity for further child-bearing, and questionable gain it is to deliver a living child by means that rend the reproductive apparatus to pieces.

Such severe labour, especially when followed by sepsis, quite frequently leaves the woman sterile, or although fertile, unwilling to undergo the trials of childbirth again; while others, on account of uterine displacement or weakness of the pelvic floor, have their usefulness as members of society permanently impaired.

Let it not be thought that I am imputing lack of skill to the practitioner in general. Far from it. The skill is there but it is discouraged by the absence of the accessories and conditions necessary to make it effective.

THE PUERPERIUM CONSIDERED AS A PERIOD OF POST-OPERATIVE CONVALESCENCE.

The wound in the uterus left after the separation of the placenta is entirely comparable with that left after the vaginal enucleation of a large uterine fibroid, and the perineal wound caused by the child's head with that incurred in the performance of plastic enlargement of the vaginal orifice.

The wounds of labour are more likely to become infected than those of the gynæcological operations I have cited, because labour is a larger operation involving more bruising of the tissues, and, under present conditions, is not performed under anything like the same conditions of surgical asepsis. Moreover sepsis, if it occurs, tends to run a much more severe course, because of the enormous venous and lymphatic hypertrophy that accompanies pregnancy.

The general management of puerpery should be conducted in the same way as the convalescence after any other vaginal operation. The wound in the uterus is inaccessible, and we have no means of dressing it, but we can help to secure drainage by propping the patient up in bed. The perineal wound, if it was aseptic when it was sutured, needs no dressing. I believe that it is very rare for any wound to become infected *after* it has been sutured. But to close an already infected wound is disastrous.

The teaching that has for a long time obtained in text-books, that all perineal lacerations should be sutured, urgently requires to be supplemented by the proviso that, before doing so, they must be sterile, otherwise it is far better to leave them open and at least secure drainage. To close up with sutures an insignificant perineal laceration which is already infected by the passage over it of fingers recently contaminated by the anus, directly makes for serious sepsis. That recently infected—even heavily infected wounds, can be sterilized before suture by the application of antiseptics has been proved conclusively during the war.

Septic perineal lacerations can be treated by the direct application of antiseptics, but for sepsis of the placental site we have at present no treatment beyond supporting the patient's strength—and he who thinks otherwise deceives himself.

The whole teaching on the subject of the treatment of puerperal uterine sepsis needs to be revised. Consider the problem. The patient is suffering from the effects of an acute toxæmia originating from organisms sequestered in the uterine sinuses, veins and lymphatics, and perhaps in other situations still more remote from the uterine cavity. To remove or kill the organisms or neutralize their toxins is the only solution of the problem, and we can at present do neither the one nor the other. Instead, what is done? The uterine cavity is douched or explored with the finger and scraped—a futile proceeding, for the organisms in the cavity are not those causing the symptoms. But it is worse than futile, it is dangerous, for the necessary manipulation frequently dislodges thrombi and liberates organisms into the blood stream at large. The rigor that so frequently follows these proceedings is characteristic of the entry of injurious matter into the circulation—you see it in malaria when the stretched blood corpuscles rupture and the spores escape; and after intravenous infusion, especially of foreign serum.

I have over and over again seen cases of relatively slight puerperal fever converted into examples of virulent sepsis by these mistaken methods of treatment. They are perpetuated by the continued teaching of that gross error that puerperal sepsis is commonly caused by fragments of the gestation retained in the uterus.

It is astonishing how blindly unobservant we all are and how stiffly we become obsessed with what is taught us, though it fly in the face of the obvious. *There are no gross retained pieces in the uterus in puerperal sepsis; not once in a hundred times.* A variable quantity of soft débris can be scraped out of any puerperal uterus, septic or not septic. We must get rid of all that German teaching about "septicæmia" and "sapræmia," and the "germs that flourish on dead tissue" which is so dear to the heart of the student, and start to think for ourselves.

The placental site infected by organisms originally derived from the bowel is from the pathological standpoint exactly comparable with the infected wounds of the late war. Gas gangrene is uncommon in puerperal sepsis, because the muscle of the uterus is unstriped, and the *Bacillus aërogenes* flourishes chiefly in striped muscle; while, moreover, the extensive bruising and laceration that in war wounds aids the development of this organism is absent. But in all other respects the obstetrician has always been familiar with those results of profound wound sepsis which have come as a surprise and a revelation to a generation whose experience has been limited to the results of wounds as modified by the practice of Listerism.

Owing to the anatomical position of the placental site, the methods which in the later phases of the war were applied with such conspicuous success to infected bullet and shell wounds, are only very partially applicable to the major wound of labour. These methods were of three kinds:—

(1) The immediate sterilization of the wound by strong antiseptics before the infection had time to become profound.

(2) Progressive sterilization of wounds already profoundly infected by the continuous application of antiseptics until such period as the wound became aseptic, after which closure might be effected (Carrel).

(3) Immediate excision of the whole wound before the organisms implanted in it had time to multiply at all.

The first method has a scope in these cases in which it is known at the time of the labour that the uterine cavity has probably been infected as the result of intra-uterine manipulation or instrumentation. In such it is possible by the immediate application of a strong antiseptic to destroy the infecting organisms. The antiseptics of the aniline group are peculiarly suitable for such immediate sterilization.

The second method which was developed by Carrel and Dakin with most successful results is not capable of satisfactory application to the profoundly infected placental site, for more is demanded than the mere continuous application of an antiseptic. Previous excision of the wound, or, if this be impossible, very thorough cleaning up of it, together with removal of all damaged and dead tissue, and the freest drainage is required. It is impracticable to do this in severe puerperal sepsis, for the placental site is too inaccessible to allow of thorough cleaning up, whilst excision of it is impossible short of removing the uterus, and by the time the patient is sufficiently ill to suggest such a drastic step the organisms have, as a rule, spread beyond the uterine wall. Moreover the technical difficulties of arranging irrigating tubes so as to be sure of reaching every part of the infected uterine surface are great. The method might be successful could it be carried out in the earliest stages of puerperal infection, but the manipulations necessary to the proceeding carry with them a risk of dislodging infected thrombi, which probably outweighs the advantages to be gained.

The third method, which was the culminating achievement in the treatment of war wounds, is utterly inapplicable to the major wound of labour. It would necessitate the performance of hysterectomy at the close of every confinement in which there was a possibility of infection of the placental site.

The attempts that have been made to destroy the organisms of puerperal sepsis or neutralize their toxins by antidotal sera, vaccines and the intravenous injection of bactericides have all up to the present been dismal failures. It is true that many patients thus treated recover, but so do patients not so treated. All of us are a great deal too much inclined to mix up *post* and *propter hoc*. My own opinion after an extensive trial of all these methods of treatment is that they are useless.

A method of curing puerperal sepsis will doubtless be discovered in the future, but until then prevention is our only weapon. And thus I come back to the urgent necessity for regarding labour as a surgical operation fraught with risks of sepsis *against which nothing short of a very elaborate antiseptic technique will suffice.*

CONCLUSIONS.

The conception of midwifery as a surgical art necessitating for its successful prosecution the full gamut of modern surgical requirements implies nothing less than a complete alteration of the conditions under which it is at present practised, and until this change is accomplished no satisfactory diminution of the mortality of child-bearing can be expected.

The co-operation of the public is essential, and this will not be secured until it is made to understand that the national and individual advantage accruing from the change are worth the large sum of money which will have to be spent on it.

In the present state of affairs the slight demands made on behalf of his art have resulted in the public habitually underpaying the obstetrician, though the outfit and skill demanded of him are at least as great as those required in other departments of surgery, while the time, trouble, and general wear and tear that attendance on a confinement involves, is out of all proportion greater. *Midwifery, in fact, does not pay*, except in so far as it serves as an introduction to other forms of practice; a pernicious thing, for underpaid work can never be the best work.

On the other hand it is essential that the monetary cost of child-bearing—cost to the husband and wife, I mean—shall not be so high as to discourage reproduction. It may with much justice be argued that the expenses of childbirth up to a certain equitable figure should in all cases be born by the nation to whose advantage the child is brought into the world.

The passing of the Midwives Act and the recent establishment of ante-natal clinics in many parts of the country are both steps in the right direction, but much more is needed.

A midwife single handed, still less than a doctor single handed, does not comply with the requirements of labour, which like any other operation demands "team work" for its proper conduct.

No figures are available giving the yearly number of recognized surgical operations performed in this country, but the total must be considerable. The larger proportion of them take place in hospitals, a smaller proportion in nursing homes, and the remainder in private houses.

When the public has been made to understand that labour itself is a surgical operation there will be a similar distribution of confinements. This will necessitate the establishment of large lying-in hospitals all over the country, maintained out of public funds, either national or municipal. Besides free beds there should be paying wards and separate rooms for such as can afford them, the amount to be paid being arranged according to the patient's financial position, judged, perhaps, on their rate assessment.

These hospitals should be the centres for the teaching of midwifery, both to medical students and midwives, the former of whom should be resident in them for at least three months.

Extern departments as they are at present carried on should be abolished. They perpetuate all the worst features of midwifery as practised to-day, the inadequate surroundings, the wretched light, the meagre assistance and the dirt, and lead the student to think that the régime of the labour ward is an academic ideal unrealizable in general practice.

Women unable or unwilling to enter the lying-in hospital would fall into two classes: First, those whose means enabled them to command the necessities for the surgical conduct of labour in a nursing-home, or in their own home; and, secondly, poor patients whose entry into hospital was impossible on account of domestic reasons or the sudden onset of unexpected labour.

This latter class might be dealt with by having attached to the central hospital an extern team—i.e., an obstetric surgeon, an anæsthetist, and two nurses, with a complete outfit and a motor car to carry them. The team should be able to be summoned free by the medical man or midwife in attendance on the case, for given such a team the requirements for the surgical conduct of labour could be constructed in the poorest room, just as they can be for an emergency operation in recognized surgical practice.

In the staffing of these large hospitals the medical men of the town or district should take a large part and be paid for doing so, but a certain number of resident obstetricians would also be required. Patients taking private rooms should be attended by their own medical man, and should pay him an adequate fee. The permanent resident staff should be at his service and should co-operate with him in the conduct of the labour, the routine of which he would already be quite familiar with, having been trained in that or a similar hospital.

Such is a rough sketch of what is required before we can hope to see a progressive diminution in the mortality of child-bearing comparable with that already effected and continuing to be effected in every procedure of recognized surgery.

Let me not be misunderstood. I want to see midwifery not necessarily more "operative," but more "surgical," which is quite another thing. I want to see it taught and practised as a branch of surgery. The difficulties in the way of attainment are great, for we have to undo the results of fifty years of cramped outlook and "laissez faire." The whole edifice of obstetrics needs to be set in order, but the foundations, the primary concept for which we, as teachers, are entirely responsible, first of all.

DISCUSSION.

Sir FRANCIS CHAMPNEYS: I notice that Mr. Bonney's tables are based upon the ratio between the number of maternal deaths and the number of *live births*. Why is this method adopted? The results are somewhat strange to me, and would seem to show that practically no improvement has taken place since 1849. In 1910 I replied to a somewhat similar statement by Sir William Sinclair from figures furnished from the Registrar-General's Reports, and embodied in Appendix A of the Report of the Departmental Committee on the working of the Midwives Act 1902, p. 24, by the following quotations: "From Table A, giving the annual death-rates from puerperal sepsis per million of females living, it would be seen that the death-rate in 1902 was 118, and in 1907 it was 81. The census of 1901 showed that in England and Wales there were 16,800,000 women. The saving of life in 1907, as compared with 1902, was 37 per million. In other words, the lives of more than 621 women were saved in 1907 which would have been lost in 1902. Table B, calculated in the proportion of 1,000 births, showed the same thing, and these results were graphically set forth in diagrams A and B. Diagram C, showing the death-rates from puerperal sepsis and accidents of childbirth to 1,000 births, shows that this rate prior to 1903 was never below 4·41; in 1907 it was 3·83. Striking evidence was given before the Departmental Committee to the same effect. As regards infantile mortality, Dr. Robinson, of Rotherham, stated that while the death-rate in cases attended by midwives was 101 per 1,000 in 1907, the death-rate in cases not attended by midwives was 194; in 1908 the mortality in midwives' cases was 92, in non-midwives' cases 195." I have been favoured by Dr. Stevenson, of the General Register Office, Somerset House, with a continuation of the figures up to and including 1911, and now give the calculation up to that date which is arrived at by substituting the results of 1911 for those of 1907: "From Table A, giving the annual death-rates from puerperal sepsis per million of females living, it would be seen that the death-rate in 1902 was 118, and in 1911 it was 72. The census of 1911 showed that in England and Wales there were 18,672,986 women. The saving of life in 1911, as compared with 1902 was 46 per million. In other words the lives of 859 women were saved in 1911 which would have been lost in 1902 Table C, showing the death-rate from puerperal sepsis and accidents of childbirth to 1,000 births, shows that this rate prior to 1903 was never below 4·41; in 1911 it was 3·67." These figures show that the passing of the Midwives Act was followed by a sudden and considerable fall, and that the improvement since this has been gradual and comparatively slight. It would seem that the great initial improvement in the puerperal mortality must have been due to improvement in the midwives; we may hope for still further improvement not only in cases attended by midwives but by medical practitioners, but can hardly expect so striking a change in the future.[1] So far from the subject being buried in a general gloom of despair three things plainly emerge from the above considerations: (1) That the bringing into operation of the Midwives Act was marked by a sudden and striking drop in puerperal mortality; (2) that this must have been due to the operation of the Act upon the practice of midwives only; (3) that no such marked improvement took place in the mortality from accidents and diseases of child-bearing other than sepsis. These facts are clearly evident also from Sir Arthur Newsholme's tables quoted by Mr. Bonney. In order to ascertain where the defect lies it is important to know by what class of attendant patients are delivered; and, with this object the Central Midwives Board some years ago asked the Registrar-General to allow a space to be left in birth certificates for the name of the person actually delivering the mother, but this application was not successful. I agree with Mr. Bonney that the present loss of life and health is not satisfactory, and that we must do all in our power to reduce it.

Mr. Bonney says: "The year 1870 brings us back to the initiation of 'Listerism,' and one would naturally suppose that in the years prior to this great event the mortality from puerperal sepsis would be found to be considerably higher than the years after it. But . . . the Registrarial figures show nothing of the kind." The history of antiseptics is one of the most curious on record. The discoverer of antiseptics was not Lister in 1870 but Semmelweis in 1847. The medical world would have none of him, and he died in despair, insane. Had they not been so stupid and prejudiced obstetrics would have been in the van, and surgery would have followed in the rear. As it was, the order was reversed, and those who refused to enter the promised land had to wander some forty years in the wilderness. Now, although Listerism was initiated in 1870, antiseptic midwifery was only started in any London lying-in hospital in 1880, when it was set up at the General Lying-in Hospital by Sir John Williams and myself. The methods of Lister had to be adapted to obstetrics, and we had to feel our way, but the results were immediate and striking. Antiseptics in midwifery were only absorbed gradually and slowly into private practice; I doubt whether they are even now thoroughly and universally carried out. I should like to know the facts on which Mr. Bonney founds his statements that: "Even in those (past) days by far the larger proportion of the cases of puerperal sepsis were probably due, as they are now, to infection by the bowel organisms of the patient herself." It is plain that Mr. Bonney considers the anus the chief source of septic danger. How does he account for the following facts: A ruptured perinæum has no special tendency to become septic; it generally heals quickly and healthily; operations on the perinæum and rectum have no special dangers from sepsis? How could these things be if the anus were such a plague spot as Mr. Bonney thinks? The presence of bowel organisms is undoubted, but they seem to do no special harm. The case with the other end of the alimentary canal is much the same. The mouth of an average man is so septic that the rinsings from it if injected into mice are generally fatal. And yet we do not get septicæmia from the extraction of a tooth or from biting our tongues. I suppose that in this case Nature has placed the dock-leaf near the nettle, and that a natural immunity has been created and maintained by antibodies. Nature is not so foolish as Mr. Bonney imagines.

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[1] *Proceedings*, 1910, iii (Sect. Obst. and Gynæcol.), pp. 231, 232: *see* also *Journ. Obst. and Gynæcol. of Brit. Emp.*, 1914, xxv, pp. 304, 305.

I cannot agree with his condemnation of "German" teaching about "septicæmia" and "sapræmia," nor that it should be got rid of. A case of sapræmia is one of the most picturesque of medical experiences, though such cases can usually be only suspected and not proved until they are over. Innumerable times have I seen a patient gravely ill with the usual symptoms completely and quickly convalescent after removal of retained products, usually after a single and severe rigor.

With much of what Mr. Bonney says I agree. Midwifery needs developing on a large scale throughout the country, with large and well-equipped lying-in hospitals within the reach of all, and with the organization of team-work. As to the delivery of every parturient woman in an institution I do not believe that it would be feasible, even if desirable, but I believe that the nation is determined that insanitary homes, in which a woman cannot safely be confined, shall become a thing of the past. Finally, Mr. Bonney's picture of the "average lying-in room in the average middle-class house" does credit to his imagination. I think it must be a "composite photograph," for I cannot believe that he has ever seen all the articles enumerated in his inventory in the same room at the same time.

Dr. HERBERT SPENCER: There are many points in Mr. Bonney's paper with which I am in agreement, such as the treatment of the septic uterus, the need for an increased number of lying-in beds, and for improvement amongst certain practitioners of their antiseptic and aseptic methods. But I think Mr. Bonney, in calling labour a surgical operation, has been led into a somewhat illogical position. His paper deals with maternal mortality and its prevention by those antiseptic and aseptic measures which every student learns, and his remarks about the modern conduct of labour are too sweeping and are an unmerited aspersion upon the great bulk of practitioners and nurses. The statistics given by Mr. Bonney are admittedly inaccurate, owing to altered methods of registration in recent years; but it is also unfair to give the percentage of maternal deaths to the number of live births instead of the number of labours. In any case, if labour is a surgical operation (as Mr. Bonney maintains), the obstetrician can congratulate himself, for a mortality of 1·3 per 1,000 from sepsis can be shown for no other surgical operation of importance. Mr. Bonney is mistaken in regarding organisms from the patient's skin as the chief cause of death in puerperal sepsis. Is it true that Nature has made a mistake in placing the birth passage near the anus? It seems to me more probable that there has been no mistake, but that Nature, in placing it there, has given woman fifteen years to become immune to the action of the rectal micro-organisms. Everyone must have been struck with the uniform success of plastic operations for old complete ruptures of the perinæum, in which no antiseptic is applied to the raw surface, which must be infected with the *Bacillus coli.* The suggestion to disinfect the rectal contents during labour by inserting a suppository seems to me to be unpractical in view of the action of labour on the rectum. Mr. Bonney's picture of the shortcomings of maternity nurses in preparing the lying-in chamber is exaggerated, and only less highly coloured than the antiseptic he recommends. I think British mothers would object to have their babies' heads stained green. Every obstetrician agrees as to the importance of gloves, aseptic clothes and dressings and antiseptics for the skin ; but the ordinary antiseptics, especially perchloride of mercury, prevent deaths from sepsis in the practice of those who employ them properly. However convenient to the obstetrician the clinic may be, I maintain that in a decent private house a patient can be attended as safely as regards sepsis, and, in some respects, more safely than in a clinic. No doubt there is a need for more lying-in beds for patients with inadequate houses, but a large proportion of pregnant women will always have to be delivered at home. Outdoor maternities show a very low mortality from sepsis, and are a valuable training-ground for students. Mr. Bonney admits that the "extern team" could deal with the cases in the homes of the poor, but the motor-car with its obstetric surgeon, anæsthetist, two nurses, and complete outfit would not suffice for the attendance of half-a-dozen women at the same time.

Dr. AMAND ROUTH : The question of how to lessen the maternity and infantile death-rate has been the theme adopted by most Presidents in their inaugural addresses. In 1911 I took up the subject and showed that in the previous twenty years the total maternity death-rate had gone down from 6·5 per 1,000 living births to 4·7, the deaths due to sepsis from 2·6 to 1·4, and the proportion of septic deaths to total deaths had been reduced from 45 to 28 per cent. There seemed then to be reason to hope for further progress, founded upon the better education of midwives and medical students in antiseptic midwifery ; the substitution of trained midwives for the 12,500 untrained midwives put on the Roll of Midwives by the Midwives Act of 1902 ; and the enforced notification of cases of puerperal septicæmia throughout England and Wales in 1911. This hope has not been justified, for the improvement between 1892 and 1910 has not been continued. (The total maternity death-rate per 1,000 living births in 1917 having been 4·8, and the death-rate from sepsis 1·3, whilst the percentage of cases of sepsis to the total deaths remained at 28 per cent., almost identical figures.) Mr. Bonney's views that obstetric examinations, manipulations and operations should be treated as surgical cases is obviously correct, and his proposals, so far as they are practical, are also entirely justified. His view that puerperal septicæmia is not infrequently due to infection from intestinal organisms is however not proved by him, nor do I think his consequential proposals to prevent such infection are practical. The germs present in the bowels are: *Streptococcus fæcalis*, *Bacillus bulgaricus*, *Bacillus coli communis*, *Bacillus acidi lactici*, and *Bacillus enteritidis*. What evidence is there that any of these ever produce septicæmia? It would have been more convincing if Mr. Bonney had brought bacteriological evidence to prove that normal intestinal organisms can produce puerperal septicæmia. Mr. Bonney blames Nature for placing the birth area near the intestinal exit. In all mammals, except monotremes and marsupials, the allantois becomes attached to a definite region of the uterine wall, and a placenta is formed in the higher mammals with interlocking of maternal and fœtal tissues necessitating a tearing of the fœtal from the maternal portions of the placenta at birth, whilst in the lower mammals there is a so-called discoidal placenta where there is no such intimate interdigitate union, and the fœtal placenta separates easily from the maternal placenta. Roughly speaking a common cloaca does not exist in placental mammals, except in some rodents where the placenta is discoidal, so that Nature has deliberately placed the recto-vaginal septum between the uro-genital and the intestinal exits wherever there is a birth separation of the placenta which involves an intra-uterine wound. This difference between amphibians, reptiles and birds, on the one hand, and placental mammals on the other, proves that the question of a "danger zone" was duly considered by the Creator, and no further separation of the intestinal and birth areas was considered necessary than has been provided. If intestinal organisms were as infective as suggested, hosts of mammalian animals would die of puerperal septicæmia. Think of what happens when a litter of pigs is born in a pigstye. Surely, too, the results of operations in what Mr. Bonney calls "the danger zone" are prima facie evidence that normal intestinal organisms do not infect wounds in the same individual owing to natural immunity. One has only to name operations for piles, fistulæ, and for torn perinæums ruptured even into the bowel itself. Such operations prove successful even though fæces may be contaminating the wounds during the operation. Operations on perinæums ruptured into the rectum, weeks after the occurrence, with intervening daily soiling of the rupture area by fæces are frequent, yet the plastic operation is quite successful. I believe that cases of auto-infection are very rare, and that the anal area is not a source of infection apart from abnormally virulent organisms, or organisms which have become virulent during acute intestinal affections. Individuals are immune against their own normal organisms. As regards treatment of early localized septicæmia, the prompt exploration of the uterine cavity under anæsthesia, if the temperature is going up *early* in the puerperium, and the gentle use of a blunt flushing curette or a bunch of gauze held in forceps, followed by a free application of a 1 in 4 iodine solution all over the mucosa, and especially over the raised placental site, will stop the large majority of infections before the pelvic veins are involved and the septicæmia generalized. And in all such septic cases I strongly recommend twenty-drop doses of liq. ferri perchlor. every three hours, even in apparently hopeless cases, for I have seen many such cases recover in puerperal and other cases of acute sepsis which had been given up by others.

Dr. RUSSELL ANDREWS: There is one point on which I cannot agree with Mr. Bonney absolutely—viz., that in septic cases there is seldom retention of a piece of placenta. From a teaching point of view this is a dangerous statement. In cases that come under my care retention of a portion of placenta occurs much more commonly than in 1 per cent., sufficiently frequently to justify a warning as to the danger of omitting to examine the placenta carefully in every case of labour. I agree, however, that in the large majority of cases of puerperal sepsis the uterus is empty. Some such scheme as that which he has sketched is necessary for the treatment of patients who cannot pay a fee which is large enough it make it worth the while of their medical attendant to devote, if necessary, many hours to their case. It is greatly to be regretted that a doctor, who is going to receive a fee of a guinea, or 30s., for attendance, cannot, from a purely business point of view, wait for the natural termination of a tedious labour. Some do, but there is a great temptation to hurry the delivery. It is not uncommon to have patients sent into hospital on account of so-called obstructed labour, repeated attempts at delivery with the forceps having failed, when the only obstruction is the incompletely dilated cervix. Among the cases of puerperal sepsis which come under my care there is a very high percentage of cases of forcible extraction with the forceps with tearing of the cervix and vagina and perinæum. A remark made to me some years ago by a doctor who had sent into hospital a patient with eclampsia is pathetic and instructive: "I can't help feeling that I did the right thing in sending her into hospital, although of course I lost the guinea!"

Dr. LAPTHORN SMITH: I agree with everything Mr. Bonney has said. Although there has been an immense improvement in the care of the parturient woman since the Midwives Act has come into force much yet remains to be done. Some of the most necessary things she requires she does not get; such for instance as fresh air, sunlight, and plenty of water. And yet they cost nothing. No one who has not actually seen it would believe the conditions under which many thousands of confinements take place. In mentioning the insanitary contents of the crowded room and the small amount of air space, Mr. Bonney has understated rather than exaggerated the unclean surroundings. The windows closed to keep out the air, a shawl or shirt pinned over the window to keep out the light for fear of giving the baby sore eyes, the lack of pure cold water for fear of giving the mother a chill when her system is craving for it to make good the loss by perspiration, respiration, urination and defæcation, as well as the large amount required for lactation. Another thing from which even the poorest might benefit but from which she is debarred by prejudice, is drainage. The prehistoric nurse will not allow her to lift her head from the pillow, and as a result large clots and decomposing débris from the uterus remain for ten days in the vagina, as a most favourable culture medium for bacteria, which are absorbed through the placental site or leak through the tubes into the peritoneum. If she sat up on a chamber six times a day to pass water and sat up in bed for meals and nursing she would get drainage. Then again there are many very busy practitioners who are opening abscesses and dealing with pus all day who are suddenly called to a confinement only to find that there are no facilities for disinfecting their hands. The untrained nurse may just have left an infected case. The woman runs a double risk from which two pairs of rubber gloves boiled in the tea kettle would save her. I would like to hear that they were used at every one of the thousands of confinements which take place every year. Then again there is the large number of deaths from eclampsia, not one of which would take place if every pregnant woman was instructed to have her water examined at least once a month during the last four months. Doctors, midwives, and ante-natal clinics should all combine to make this fact known. Then there are the tears of the cervix and perinæum due to the too early application of the forceps, or as Mr. Bonney has said, before the cervix is half dilated. The doctor who produces these tears will often tell you that he has never seen a tear of the perinæum ; and I quite believe him, for he does not look for them, and even if he did he would not see them in the badly lighted room. But if both tears of the cervix and perinæum were immediately repaired under aseptic conditions the mortality and morbidity of childbirth would be greatly lessened. Why does the harassed general practitioner do those things which he should not do, and leave undone the things he should do? Mr. Bonney and several other speakers have given the explanation. It is the pitiful fee of one guinea for spending a night in such a place as has been described, and then making ten visits free and paying for the cab and the chloroform out of his own pocket. Until all women can be taught to look upon a confinement as a serious matter, not to be entrusted to any inefficient practitioner, but to a well trained and decently paid doctor, who alone should have the choosing of the nurse, and to put herself in his hands during the whole of her pregnancy, there is not much chance of abolishing the death-rate. It is not always because the people cannot afford to pay a decent fee but because they have not been educated up to it. I am sure that most of the deaths from puerperal diseases occur among the class above described. Would it not be far better that all these women should be sent into a hospital for confinement under aseptic conditions, where, if they were sent in early, there would be no deaths. By so doing, senior medical students and midwives would be able to gain valuable experience by seeing them delivered by a master of the art, who would show them over and over again how an ideal delivery should be conducted.

Mr. HAROLD CHAPPLE : Like Mr. Bonney, I wish to see midwifery conducted on modern surgical lines. In spite of the assurances of some of the speakers that all is well, there is no question that many women die annually and very many more are permanently crippled as a result of childbirth. In the majority of cases the cause is sepsis. Nor is the reason far to seek, as the circumstances under which labour is conducted are, to those of us who are trained in modern methods of asepsis, often pathetic in their complete disregard of the requirements of modern surgery. The interior of the uterine cavity is sterile, as we have proved many times from swabs taken from the uterus in cases requiring Cæsarean section. The treatment of an infected uterus is at its best so unsatisfactory that our utmost endeavour should be to render it impossible for that organ to become infected. Yet there are still many men who might hesitate to place an infected hand or instrument into the peritoneal cavity, but show in practice no such regard for the uterine cavity in the full knowledge of the tragic sequelæ that are not only possible but all too frequent.

Dr. F. J. McCann: This is a question of the greatest national importance. It must be confessed that in our war against puerperal infection we have suffered a heavy defeat. The number of deaths has been large and continues to be large, whilst the number of wounded and permanently disabled has never been estimated. The latter are numbered not by thousands but by tens of thousands. Consider the loss to the community in wage-earning capacity through chronic ill-health, and the expense even to the poorest women entailed thereby. The remedy is hospitals, hospitals and again hospitals. State subsidized hospitals should be established throughout the country. I desire to see in every village a maternity hospital as well as the village church, where the gospel of cleanliness would be taught. The great advantage of a hospital in this regard cannot be overestimated, for it is no exaggeration to state that some women are thoroughly washed for the first time in their lives during their residence in the hospital. The question of child-bearing mortality is closely bound up with the question of the housing of the poor, for it is the environment of the parturient woman which so often militates against her smooth recovery. Her surroundings are squalid, dirty, and insanitary. An important housing scheme is about to be provided, but this is not enough unless the householders are taught to be clean. The gospel of cleanliness must be preached to the people, and here there is a fruitful field of work for the clergy and the health visitor. These reforms require both time and money, but two changes might be brought about without delay: First, the provision of cheap obstetric outfits for the poor, say at a cost of ten shillings. Now that there is a maternity benefit, this money is better spent on an "outfit" than on beer to celebrate the occasion. When required, additional funds might be forthcoming from the various charitable societies. Secondly, accommodation should be provided at the hospitals for cases of puerperal infection. It is a blot upon our hospital system that women suffering from puerperal infection should be so often denied admission, and left to die in their own homes without the skilled nursing and attendance which they so urgently require.

Mr. S. G. Luker: I endorse the opinions expressed by Mr. Bonney. With regard to the origin and source, however, of the organisms causing puerperal infection, I cannot entirely agree with him that the case against the bowel organisms is a strong one, in acute septicæmia cases, at any rate. The result of bacteriological investigations carried out mostly by Dr. Western on a large number of puerperal septicæmia patients admitted to the isolation ward at the London Hospital shows that *Streptococcus pyogenes* is almost always the organism found in acute generalized infection. On only two occasions has *Bacillus coli* been found in blood culture. Further, on general bacteriological principles, individuals are considered to be more or less immune to their own organisms, as is shown by the rarity of general infection after operations on the anus, rectum and abdomen, where injury to the gut is present.

Dr. R. A. GIBBONS: Mr. Bonney says that there are no retained products in puerperal sepsis, not once in a hundred times, and that we must get rid of that German teaching about septicæmia and sapræmia. With this I cannot agree. My experience shows that in certain cases where the temperature has risen suddenly after confinement, judicious exploration of the uterus and removal of retained membranes, or a piece of placenta, with subsequent antiseptic irrigation of the uterus, is followed by a drop in the temperature. If the uterus is found to be empty, internal manipulation is contra-indicated. With the rest of Mr. Bonney's paper, I am in full sympathy. I hope the day will come when there will be established all over the country lying-in hospitals, with men on the staff who are fully paid, and who can devote themselves entirely to the work of the institutions, and to consulting obstetric practice only, outside. I also hope that these institutions may be centres from which a regular obstetric outfit can be sent to any house asking for it, and in small towns and villages where there are no such institutions, charitable centres may be formed for the distribution of these outfits, which should include sterilized sheets, &c., to the poorest people. In my own practice, my nurses are instructed to have sheets, nightdresses, towels, &c., sterilized before they are likely to be required, and the tin containing these things is only opened when the patient is in labour. In ordinary houses asepsis is almost impossible, but I believe education is the only means which will bring about improvement in the present method of managing the ordinary lying-in room in the vast majority of cases. But although it is almost impossible to secure perfect asepsis in the lying-in room, every attempt should be made to do so. Some think that the mere fact of wearing india-rubber gloves seems to be sufficient, whereas gloves are dangerous in giving a feeling of security unless every precaution is used during the time they are worn, and I have numerous small sterilized towels with which to cover the glove if anything excepting the patient has to be touched.

Mr. GORDON LEY: I cannot agree with Mr. Bonney that the vast proportion of deaths from eclampsia are preventable. I am of opinion that not more than 10 per cent. of eclampsias have symptoms of more than thirty-six hours' duration before the onset of the fits and in a very large proportion the symptoms are of a much shorter duration. I am in complete agreement with Mr. Bonney with regard to the extreme danger of clearing out a uterus. This should never be done unless there is every reason to believe that there is something retained. Further, I feel certain that if it is done it should be performed on the earliest possible occasion, that is, on the advent of pyrexia.

Mr. VICTOR BONNEY (in reply): My paper was intended to provoke criticism. I wanted to get obstetrics moved out of the rut in which it has stuck so long. Some of the speakers have demurred to the elaborate technique I advocate, but the orthopædic principle of "over-correction of a fault" is the right one to apply in dealing with the backward condition of obstetric art. The régime of a modern operating theatre supplies many examples of precautions the direct effects of which on the operation are probably small, but which are valuable in helping to keep the standard of asepsis up to the highest possible pitch. In regard to the virulence of bowel organisms, a great distinction must be drawn between tissues which are their normal habitat and those to which they are entirely foreign. In the case of the latter the results of infection are very serious. As an example I may cite the abdominal wound in "interval" appendicectomy. If the stump of the appendix is allowed to touch the wound suppuration results in a large proportion of the cases. Still more striking examples are the radical abdominal operation for cancer of the cervix, in which a wound of the bowel is invariably followed by sepsis, so violent that the patient usually dies of it, and abdomino-perineal excision of the rectum, in which the recovery of the patient almost entirely depends on the care that is taken absolutely to prevent the implantation of bowel organisms into the great cavity left after the extirpation. The investigation carried out by Mr. A. Foulerton and myself fifteen years ago showed that *Bacillus coli communis* is present in the uterus in most of the severe cases of puerperal sepsis. I may also remind you that puerperal sepsis occurs chiefly in primiparæ, in whom a rupture of the perinæum is invariably present, and this creates a culture surface for intestinal organisms. The passing of the Midwives Act was immediately followed by a fall in the mortality, but that rate of improvement has not been maintained. This is what one would have expected. Most of the good to be obtained from the Act has already been conferred, and further marked improvement can only be effected by a radical change in the conditions under which midwifery is practised.

Section of Obstetrics and Gynæcology.

President—Mr. J. D. MALCOLM, C.M.

Report to Council on Teaching of Obstetrics and Gynæcology to Medical Students and Graduates in London.

To the PRESIDENT OF THE SECTION :

SIR,—ON March 6, 1919, the Council of the Section appointed a Committee, consisting of Dr. Andrews, Dr. Blacker, Dr. Eden, Dr. Fairbairn, Dr. McCann, and Mr. Gordon Ley, "to inquire into the teaching of Obstetrics and Gynæcology to medical students and graduates in London, and to report to the Council upon the alterations which are required to make it more efficient." At the meeting of the Council held on May 29, 1919, the Report of the Teaching Committee was considered and adopted up to the end of Section E. Differences of opinion arose with regard to Sections F and G, and the Council referred back these portions of the Report to the Committee for further consideration, instructing them to co-opt for this purpose additional obstetric physicians in order that each teaching hospital should be represented. Invitations in this sense were accordingly sent to the obstetric physician of each teaching hospital which was not already represented on the Committee.

Two meetings have been held, at which the following, in addition to the members of the Committee, were present: Lady Barrett, Dr. Comyns Berkeley, Dr. Drummond Robinson, Mr. Bellingham Smith, Dr. Spencer and Dr. Williamson. In addition Dr. Stevens and Mr. Darwall Smith attended one of the meetings.

As an outcome of these conferences your Committee now beg to submit revised proposals under Sections F and G, and Appendix C. These revised proposals received a large measure of support, but it was found impossible to secure unanimity, and it was accordingly arranged that an alternative report would be presented to the Council by Lady Barrett, Dr. Spencer and Dr. Williamson.

The Report of your Committee is therefore as follows:—

Under their terms of reference the work of the Committee falls into two parts: (1) The present methods of teaching midwifery and gynæcology to medical students and graduates in London; (2) the changes which are required to make it more efficient.

The Committee desire to point out the great importance of the subjects they were called upon to examine, not only to the medical profession but through it to the women of the country and to the community in general. The provision of doctors more highly trained in practical midwifery work, and the provision of adequate hospital facilities for dealing with serious complications of pregnancy, labour, and the lying-in period, are matters which are intimately related to one another, and are of equal importance to the public health. A large increase in the present hospital accommodation for midwifery cases in London is as urgently needed as an improvement in the training of medical students. And further, if by suitable arrangements better training in the management of infants could be associated with midwifery training, a great advance would be made in dealing with the difficult problem presented by the high rate of infant mortality.

Four medical schools were directly represented on the Committee, and in order to obtain the necessary information from all the teaching hospitals, a series of questions covering all branches of teaching were drafted and sent to each hospital. The answers were kindly supplied by the obstetric physicians, and formed the groundwork upon which the following account of the present methods is based. A list of the hospitals in alphabetical order, and an epitome of the answers obtained under each inquiry will be found in appendices A and B.

A—THE PRESENT SYSTEM: MIDWIFERY.

Systematic Teaching.—Systematic lectures are given in all the hospitals by the obstetric physicians, usually in the summer term—i.e., once a year only: the number of lectures varies from twenty to forty. A "practical midwifery" course, which includes operative demonstrations on the dummy, is also given either by the obstetric physician or by the tutor. In the latter case it is combined with the tutorial class. In most hospitals the regulations provide that students attend the systematic lectures and the practical midwifery course before being allowed to attend cases of labour. The Dean of the school may, and sometimes does, suspend this rule.

The tutorial or revision classes are held each term by the tutor, and are attended mainly by the students then preparing for the examination in midwifery and gynæcology. Attendance at the systematic and practical midwifery courses is compulsory under the regulations of the Examining Bodies. Attendance at the tutorial classes is optional, but in practice all students do attend.

Clinical Instruction in Normal and Abnormal Pregnancy.—Systematic instruction is given in the gynæcological wards and out-patients' departments of all hospitals on the diagnosis and management of pregnancy, the clinical material consisting of such women as present themselves from one reason or another during pregnancy. Pregnant women who desire to be attended at their own homes are usually required to present themselves at the hospital for examination beforehand. They are seen, usually, by an obstetric physician or by the tutor, and any students who care to attend are present and are allowed to examine the patients; the attendance of students is however not as a rule compulsory, and in practice sufficient use is not made of this department for purposes of teaching. Except in the case of hospitals with a midwifery ward, this is all the provision which is made for instruction in normal and abnormal pregnancy.

Clinical Instruction in the Conduct of Labour.—In four hospitals, viz., Royal Free, St. Bartholomew's, St. Thomas's, and University College, midwifery wards are established for the instruction of medical students: others—viz., Guy's, London, and Middlesex—have a midwifery ward which is used chiefly for training midwives; for the purposes of this report these are of no value. The remaining hospitals have no midwifery wards at all at the present time. In every hospital serious complications of labour can be admitted to the gynæcological beds, where they come under the charge of the obstetric physicians; in many cases, however, the registrar actually deals with them.

In the case of *hospitals with no midwifery ward*, the training of students in the actual conduct of labour, normal and abnormal, is practically non-existent. In order to attend the twenty cases required by the regulations of the examining bodies the student is attached to the maternity district of his hospital; previous to this he has attended the lectures mentioned above, and in addition in some hospitals—e.g., London, St. Bartholomew's and St. George's—special demonstrations are given by the Tutor or the R.O.O.[1] to each batch of students before going on the district. As a rule, however, the students of hospitals with no midwifery ward have never seen women in labour before going on the district to attend them.

Every hospital has a regulation that the student is to be accompanied to the first case or the first two cases by the R.O.O., but this regulation cannot in all instances be carried out, and the student not infrequently goes to his first case alone. It is assumed that he needs no assistance after the first two cases in conducting a normal labour, but he is under instructions to report at once to the R.O.O. any abnormal conditions which he may discover. His ability to detect abnormal conditions is however very small from lack of training. At one hospital (Charing Cross) a trained midwife in the service of the hospital is also present at every labour, and gives the student assistance; as a rule the student conducts normal cases without any assistance, even in respect of the toilet of the infant. Abnormal conditions are frequently dealt with by the R.O.O. in the patient's home; practically all hospitals have a rule that serious complications, such as ante-partum hæmorrhage or eclampsia, should be at once transferred to the hospital, where they are admitted under the supervision, usually indirect however, of the obstetric physicians. There the student is able to take part in their management, and to see any obstetric operations which are required.

The student continues to attend his district cases during the first seven to ten days of the puerperium, under the same instructions to report any abnormal conditions which may arise regarding either the mother or the child. It must be recollected that unless he has previously attended the midwifery ward, the student has received no practical instruction whatever in the management of infants; as a rule his work is done without any systematic supervision during the puerperium.

In some hospitals the number of cases available in the district is insufficient to allow twenty for each student: a certain number of students from these hospitals are sent to the lying-in hospitals, where they can be "signed up" for twenty cases in fourteen days (Queen Charlotte's), twenty-one days (York Road), or fourteen days (City of London). In some instances the student goes for a fortnight to the Lying-in Hospital, and then serves for a fortnight on the district of his own hospital.

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[1] R.O.O. = resident obstetric officer.

The character of the training given in the *lying-in hospitals* is as follows: These institutions in London are primarily concerned with the training of midwives; the fees of the pupil-midwives form an important source of income to the hospital, and their presence enables the trained nursing staff to be reduced to a minimum, which forms an important economy in expenditure. The regulations of the Central Midwives Board require that the cases they attend as pupils shall not be shared with others; consequently the lying-in hospitals must reserve for the training of their midwives an adequate number of deliveries per annum. Only the surplus is available for training medical students and graduates. From these conditions it results that very few deliveries in these hospitals are actually conducted by medical students, at the most four or five each; they are, however, allowed to be present at all, which in the case of Queen Charlotte's Hospital may be as many as eighty a month, but they are present as spectators only. The great majority of their twenty cases are "attended" in this way. The students are in residence in the hospital, but they do not go to cases in the district at all. Where the student, after a short time at the lying-in hospital, proceeds to the district of his own hospital, he has had the advantage of frequently observing the process of labour conducted by others, and has gleaned some experience of its management. There is no provision for the instruction of medical students in normal labour at the lying-in hospitals, practically all normal labours being supervised by the resident midwives. A certain amount of instruction in abnormal labour and in the puerperium is given them by the visiting physicians. The students see a certain number of forceps deliveries and any major obstetric operations that may take place during their attendance.

In the case of the *hospitals having a midwifery ward for students*, the conditions require separate notice. The number of beds in these midwifery wards varies from eight at University College Hospital to twenty-four in the Royal Free Hospital; the number of cases admitted per annum varies from 180 in University College Hospital to 550 to 600 in St. Thomas's; the number of cases admitted per student trained varies from three in St. Bartholomew's to eleven or twelve in St. Thomas's. The number of cases actually delivered by medical students in the ward is limited, in all but St. Thomas's, by the fact that, not being in residence in or near the hospital, they only attend the deliveries which occur in the daytime, except that, at St. Bartholomew's, one student is always in residence and can attend night deliveries. There is a small number of pupil-midwives at these hospitals (eight to ten per annum). In the midwifery ward the students are given practical clinical demonstrations on any cases of normal or abnormal pregnancy which may be available, on the course and management of normal labour and the puerperium, on the management of infants, and on any cases of complex labour which occur during the hours of their attendance. The instruction is given in part by the visiting physicians, but mainly by the registrar or the resident officers. The period of attendance in the midwifery ward is four weeks, and the student is not permitted to begin attending cases in the district until he has conducted a certain number of deliveries in the ward and received a certain amount of practical instruction. After this he attends his district cases alone, as do the students of the other hospitals.

Maternity and Infant Welfare Centres.—These centres, where they exist, provide opportunities for instruction in the care of the nursing mother, in infant feeding, and in the general management of the infant during the first year of life. The midwifery department of a hospital ceases to be concerned with the average normal case in ten to fourteen days after delivery; the work of these centres is a continuation of the work of the obstetrician, and its utility from the point of view of preventive medicine is generally recognized as being very great. It is of the first importance that these centres should be made use of in training students in continuation of their midwifery work, yet only five hospitals—viz., Charing Cross, Royal Free, St. Mary's, St. Thomas's, and University College—have a Maternity and Infant Welfare Centre in connexion with them. Others are soon to be started.

B—THE DEFECTS OF THE PRESENT METHODS OF TEACHING MIDWIFERY.

The *systematic* instruction given is generally speaking satisfactory, and is in the hands of the obstetric physicians. The *practical* instruction leaves very much to be desired, and in some respects merits emphatic condemnation. We desire, however, to acknowledge the great improvement which has followed the establishment of midwifery wards for the instruction of medical students. This change is of recent date and is at present operating in only four hospitals; but its great usefulness is apparent and will receive general acknowledgement. The case of the hospital having no midwifery ward for students is the least satisfactory; the additional experience which may be obtained when the student also goes to a lying-in hospital for a short time is most unsatisfactory. The following considerations must be borne in mind:—

(1) *The Hospital without a Students' Midwifery Ward.*—The grave defects of this system may be set out as follows:—

(*a*) Students learn to deliver women only under conditions in which surgical cleanliness is extremely difficult to secure. Under a satisfactory system the same principle should be followed as obtains in general surgery—viz., they should be taught upon the highest plane of efficiency which it is possible to attain, not upon the lowest which can be reached without unjustifiable risk to life. A not unfair analogy would be for surgeons to teach students the technique of abdominal operations under conditions where they would be deprived of adequate light, ventilation, and the means of cleanliness. Unless difficult cases occur requiring transfer to hospital, the student has no opportunity whatever of seeing women delivered under hospital conditions.

(*b*) Students who are taught thus, under makeshift conditions, will absorb the impression that careful and exact precautionary measures are unnecessary. The effect of such an impression upon their future work in private practice can only be disastrous, and may be related directly to the incidence of puerperal fever in the country as a whole.

(*c*) The practical clinical instruction which students receive in the diagnosis and conduct of normal labour is of so perfunctory a character that it may not unfairly be said that they are left to pick it up for themselves, with the sole aid of the lectures they have attended beforehand and the books they may have read. In a considerable proportion of cases the child is born before or immediately after the student's arrival, as the women like to delay sending for the "doctor" until the last moment.

(*d*) Unless complications occur in his district cases, he will never see the obstetric physicians dealing with labour at all; and even when patients are transferred to the hospital, the control of the obstetric physician is often indirect, and is exerted through the registrar or R.O.O. who actually deal with the cases themselves after asking his advice. The student, therefore, learns extremely little of abnormal labour; he may not see a forceps delivery during his month, and in occasional instances may go up for his final examination without having seen this procedure except upon the dummy.

(*e*) It follows from (*d*) that the student learning clinical midwifery is completely out of touch with his senior teachers; he does not see them actually engaged in the work he is trying to learn, and never has the advantage of their supervision and guidance.

(*f*) That a student should conduct deliveries in the district is undoubtedly useful, for the single-handed conduct of cases of labour may be assumed to develop his sense of responsibility, a valuable aspect of his training as a doctor. But this should come *after* and not *before* he has been made acquainted with the nature of his task. In the case of the student of average ability, to thrust responsibility upon him before he has been taught his work, will be more likely to hinder than to help him in learning.

(*g*) Attendance upon twenty to thirty cases of midwifery ought to afford invaluable opportunities of instruction and experience in the management of the normal puerperium, of minor disorders of the puerperium, and of infant feeding. Under the district system these opportunities are completely wasted, owing to the total lack of systematic supervision of the students when at work.

(2) *The Lying-in Hospital.*—The great defect here is that no direct provision is made for the *instruction* of medical students at these hospitals. They attend the practice of the hospital in order to be "signed up," but no one is responsible for teaching them. The visiting physicians pay regular visits to the lying-in wards where they are followed by a mixed class of graduates, students and pupil-midwives, to whom they give what instruction is possible in the circumstances, upon the puerperium and the management of infants. They rarely, if ever, conduct a case of normal labour, and are seldom in the labour wards except for difficult cases which require their presence. "Waiting cases" which present abnormal conditions are usually seen by the visiting physicians who may demonstrate them to the students; but under the rules of the hospital the visiting physicians do not undertake any responsibility for the instruction of medical students. It has been already stated that the student does not actually deliver all the patients he is certified to have "attended." The number he actually delivers is variable and depends upon the goodwill of the R.O.O. and the resident midwives, either of whom may supervise his work. Instruction of students is however no part of their duty to the hospital and they are under no obligation to take pains in giving it. Some students may be allowed by the R.O.O. to conduct a forceps delivery under supervision; but this depends entirely upon the goodwill of the R.O.O. himself.

(3) *The Hospital with a Students' Midwifery Ward.*—This system undoubtedly marks a great advance in the training of students, but

certain defects are inherent in it. Only four hospitals have such a ward in actual working; its size varies from eight to twenty-four beds. The greater number of cases admitted are normal cases. Students are attached to the ward, in all cases exclusively, for a period of four weeks. They come into close touch with the obstetric physicians who demonstrate cases to them and give general clinical instruction on their regular visiting days. The women are delivered by the R.O.O. or the resident sister midwife, under both of whom the students work, and by whom they are personally instructed in the conduct of normal labour. The students are not in residence except in the case of St. Thomas's, and, as a rule, only the day-time labours are seen by them. It must be pointed out, however, that the visiting physicians take little or no part in teaching the conduct of normal labour, that the more serious cases of abnormal labour are not all seen by them, and even when conducted under their supervision, they are not necessarily delivered by them.

The *small size* of the midwifery ward is one of its chief defects. It suffices to allow each student to conduct a small number of normal deliveries before commencing his work on the district; this number could with advantage be much increased. The more serious abnormal cases from the hospital district are sent in to the midwifery ward, so that Royal Free has a total of 530 cases, St. Bartholomew's a total of 1,500 cases, St. Thomas's a total of 1,500 to 1,600 cases, and University College a total of 1,700 to 1,800 cases per annum, from which abnormal cases are drawn. In this respect they all fall behind the largest Lying-in Hospital, Queen Charlotte's, which has an annual total of 3,500 to 4,000 cases delivered in the wards and on the district. It is impossible for these wards to deal with large numbers of abnormal cases, and there is no doubt that the students' opportunities of seeing difficult labour dealt with are inadequate.

The *non-continuous* character of the student's attendance, in all but one hospital, is a grave disadvantage. A large proportion of all deliveries occur at night, when the student is not there to see them. Complicated cases may occur at any time, and from their nature the great majority must be dealt with promptly. As a rule they cannot be left over until the hours of the student's attendance come round, and thus invaluable opportunities of instruction are lost. To tell the student all about a difficult case the day after it has been dealt with is not a satisfactory method of clinical instruction. The time the student devotes to the midwifery ward (four weeks) is quite inadequate, if his attendance is only in the day time, and even that may be broken up by other duties.

The bulk of the practical teaching in the midwifery wards is given by the registrar and the R.O.O., particularly in regard to the conduct of normal labour; whereas the student ought to be taught both normal and abnormal conditions by senior obstetric officers of greater experience and higher standing than the average registrar. The major part of the student's clinical teaching in *surgery* is given him by surgeons and assistant surgeons, and this is universally regarded as being necessary. It is equally necessary that he should be taught his clinical midwifery by men of similar standing. In the nature of midwifery work this would involve the presence in resident control of the midwifery ward of senior officers, who would be always available, would personally supervise the work of the labour wards, and would themselves deal with abnormal cases at whatever hour they might arise.

C—THE PRESENT SYSTEM: GYNÆCOLOGY.

A certain small number of systematic lectures in gynæcology are given by the obstetric physicians either as a part of the course of midwifery or separately. As a rule the student clerks for one to two months in the gynæcological department; although the regulations of the majority of the examining bodies require him to spend three months at clinical gynæcology the hospitals do not all enforce it. In some instances his gynæcological clerking is done in the same month as he attends his midwifery cases on the district. The number of gynæcological beds in the various hospitals varies from eleven at Westminster to thirty-four at London, the average being about twenty. In the wards the clerk is taught by the registrar or the R.O.O. to take the history of a gynæcological case, and is usually taken over the physical examination by the same officer. He follows the obstetric physician in his rounds, and is present at the operations which take place during his clerkship. His attendance in the wards may be much restricted if he is at the same time doing his midwifery cases on the district. In the wards he gets certain opportunities of making pelvic examinations under anæsthesia, and of personally assisting at operations. The operations and the operation specimens are demonstrated more or less fully, according to the custom of each operator, and the amount of work he may have to get through. In the case of hospitals with only ten to twenty gynæcological beds, the number and variety of cases seen in a month is necessarily very limited, and is in fact quite inadequate as a course of clinical training.

Among gynæcological out-patients, the student usually sees a large number of minor cases, and is allowed to examine a fair proportion of them. He needs close supervision and a good deal of assistance in learning to make the bi-manual examination, and in the case of a large out-patient clinic the number of cases which have to be seen precludes the out-patient physician from devoting close attention to the student. In a small clinic the number and variety of the cases seen by the student in one month is quite inadequate. As a rule the out-patient physician is assisted by the R.O.O., but it is rare to find any system operating for the sifting of cases, so that those most suitable for teaching may be passed at once to the out-patient physician. Usually the R.O.O. sees all the old cases and the out-patient physician all the new ones irrespective of their clinical importance.

Deficiencies in Gynæcological Training.—It is in the clinical training of the students that defects are most apparent. These deficiencies can be traced mainly to two causes: (1) The very inadequate number of gynæcological beds in all the hospitals; (2) the very inadequate amount of time which the student devotes to the subject. With regard to the number of beds it must be recollected that midwifery and gynæcology together form one-third part of the final examination, and are associated on equal terms with medicine and with surgery. The combined number of gynæcological and midwifery beds available for teaching is less than one-third of the number allotted either to medicine or to surgery. This policy of cramping the work of the obstetric physician is due partly to the failure of colleagues to realize the importance of these subjects to the medical practitioner and to the community, partly to the relatively low level of the requirements of most of the examining bodies. In both medicine and surgery the student is obliged to clerk for six months, while to clinical midwifery and gynæcology combined he does not devote more than three months at most hospitals.

D—THE CONSEQUENCES OF DEFECTIVE TRAINING IN MIDWIFERY AND GYNÆCOLOGY.

(*a*) The training of medical students is a matter of the first importance to the State, for efficient doctors are necessary to the maintenance of the Public Health. In the early years of his private practice midwifery and the minor ailments of women and infants form a large proportion of the young doctor's work, and yet these are probably the subjects in which his practical training has been most deficient.

(*b*) Since the great majority of students learn to conduct labour only under conditions in which surgical cleanliness cannot be enforced, they carry with them into practice the impression (perhaps subconsciously) that surgical cleanliness is not of the same importance in midwifery as in surgery. The makeshift methods with which they begin their experience tend to become stereotyped in their minds, and the effect of this upon their work in private practice must be very bad.

(*c*) The bearing of this point upon the incidence of death from child-bearing in the country cannot be overlooked. During the period 1891 to 1914 this death-rate of childbirth for Great Britain and Ireland was almost stationary, the fall being only from 5·8 to 5·08 per 1,000 births. This can only be regarded as extremely unsatisfactory for it shows that during a period in which surgical training made such rapid advances midwifery training made none. Indeed in all divisions of the country except Ireland the death-rate actually rose in the quadrennium 1911-1914. The conclusion cannot be avoided that both medical students and midwives are being imperfectly trained.

(*d*) The student has been accustomed to pay only perfunctory attention to the puerperium, for he has been left largely to himself at this period while attending his cases on the district; he therefore cannot be expected to realize its importance from the point of view of the health and working efficiency of the mother.

(*e*) The average newly-qualified doctor has had little or no clinical training in the management of the infant and usually leaves it entirely to the nurse. Even in the case of the well-to-do, the nurse often regards the infant as her patient, and feeds it or doses it without reference to the medical attendant. Mothers also come to think that this is the proper arrangement and to prefer the advice of the nurse. There is no doubt that many infant lives are lost owing to the fact that medical students receive insufficient clinical training in this subject.

(*f*) It is the personal experience of all the members of your Committee that medical practitioners do not consider it necessary to obtain the services of a specialist or of a hospital in the emergencies of midwifery to the same extent as they undoubtedly do in the case of general surgery. This is largely due to the fact that they have not, during their training, seen such cases dealt with by the senior obstetric officers in the way that they have seen serious surgical cases dealt with by surgeons. Their custom is to call in a neighbouring practitioner and to do the best they can.

(*g*) The lack of hospital accommodation for women in labour, and the lack of public means of transporting patients to hospital, tend to confirm the practitioner in this attitude.

(*h*) The close relation which subsists between bad midwifery and pelvic disease in women is well recognized. A sound practical training in the recognition and treatment of pelvic disease is as important as the midwifery training itself. Young medical practitioners are probably less able to recognize common forms of gynæcological disease than they are common forms of medical or surgical disease. The results are very serious in regard not only to the life but also to the health, working efficiency and subsequent capacity for child-bearing, of the women of the country.

E—THE BASES OF AN EFFICIENT TRAINING IN MIDWIFERY AND GYNÆCOLOGY.

(1) Owing to their intimate relationships these subjects should be taught, as is the British practice, by the same teachers and the training of students in them should run concurrently.

(2) Midwifery training should be extended in one direction (ante-natally) so as to comprise a fuller study of the whole course and management of pregnancy, and in the other (post-natally) so as to comprise the management of the whole nursing period and the management of the infant. Reference has been already made to the opportunities offered by the Maternity and Infant Welfare Centres for instruction in the care of the nursing mother, in infant feeding, and in the general management of the infant. The work of these centres is the natural sequence to the care of pregnancy and labour, and some acquaintance with it is essential if the application of preventive medicine to maternity and childhood is to be properly realized by the student. The co-operation of the pædiatrician in this work is very desirable.

(3) The management of labour should be taught as a surgical procedure; this can only be done in hospital, under surgical conditions, with adequate equipment, and a highly trained staff of teachers. Owing to the peculiar nature of the work the senior officers upon whom the ultimate responsibility rests should be resident in the hospital, or should be available at any time their presence may be required.

(4) There should be adequate hospital accommodation in all large centres of population to allow of all serious obstetric emergencies being immediately admitted for treatment; this is recognized as being

necessary in respect of surgical conditions, and it is equally necessary in respect of midwifery.

(5) From (4) it follows that the number of beds available for cases of midwifery must be very largely increased, allowing due provision to be made for the emergencies which so frequently arise.

(6) Medical students and midwives cannot be suitably trained in the same institution, unless in separate classes.

(7) The proportion of beds allotted to midwifery and gynæcology is quite inadequate to the importance of the subject from the point of view of the public health; the number should bear a definite proportion to the total number of beds in the hospital; at the present time the average proportion is less than one-twentieth of the total in the twelve hospitals shown in Appendix B; this proportion should be increased to at least one-tenth. A considerable number of gynæcological cases are dealt with by the surgeons in the surgical wards, which are largely lost for teaching purposes.

(8) The requirements of the examining bodies in both subjects should be strengthened, so as to enforce (*a*) an adequate period of clinical training during which the student should be allowed to undertake no other work; (*b*) the provision of suitably arranged and sufficiently large facilities for clinical work.

(9) In the system of training the following methods of instruction should be followed, their relative importance being in the order named :—

(*a*) Clinical demonstrations upon patients, in out-patient departments, wards, operation theatre and labour wards.

(*b*) Demonstrations of specimens, fresh and preserved.

(*c*) Lecture-demonstrations, at which surgical anatomy, the construction and use of instruments, the details of operative procedures, &c., can be shown in detail. Under this head would be included the present practical midwifery lectures.

(*d*) Systematic lectures, which should be limited in number, and concerned with principles rather than details.

(10) The extent to which the student's training is influenced by the nature of the qualifying examination must not be overlooked, and the present system of examination in midwifery and gynæcology urgently needs amendment. The examination of the Conjoint Board for example is very unequal owing to the large number of examiners from different teaching hospitals in London and from provincial universities, who often set widely different standards. And the absence of a clinical examination in both subjects leads the student to neglect his clinical work and to underrate its importance.

The examining authorities should be urged, whenever it is possible, to recognize the principle that the student should be examined by his own teacher with a second examiner as assessor, and that clinical examinations should be accorded the same importance as in the case of medicine and surgery.

F—SKETCH OF A SATISFACTORY SCHEME.

(I) The inadequacy of the clinical facilities in the existing hospitals not only for teaching midwifery, but also for the treatment of pregnant women and women in labour, has been already emphasized. It is not possible for the existing hospitals to allot the number of beds to midwifery which are required, in view of the deficiency of their present accommodation in all departments, as is shown by the long waiting lists which are found at all hospitals. Before long, additional hospital space will therefore have to be provided to meet the requirements of the community, and full use, for teaching purposes, should be made of this new provision.

(II) There are two different lines upon which fully equipped departments, of adequate size, for the teaching of midwifery and gynæcology, could be organized :—

(*a*) Certain of the larger teaching hospitals might provide for a great expansion of their existing midwifery wards, from which, with their associated gynæcological, pathological and other services a midwifery department could be formed capable of providing for the training, not only of their own students, but also, if necessary, of students from other hospitals where there is no midwifery ward in existence.

(*b*) New centres might be founded in outlying districts where there is at present no adequate maternity service. These new centres, though not in proximity to existing teaching hospitals, might be affiliated to certain of them which were unable to develop fully equipped maternity departments of their own, and which might send their students to the new centre for training. These new centres could be made use of, for training not only students, but also postgraduates, and in addition they would afford much needed facilities for research.

In the case of both (*a*) and (*b*) a small number of midwives could also be trained for service in the institutions.

(III) *Departments* developed out of existing maternity wards at a teaching hospital (Subsection II*a*) ought to provide a minimum of seventy-five beds, of which fifty would be for midwifery and twenty-five for gynæcology. Of the midwifery beds a certain number would be allocated to ante-natal conditions and puerperal complications. "Departments" developed in connexion with the larger teaching hospitals, which have greater facilities for expansion, might exceed these figures if students from other hospitals were received in addition to their own.

In the opinion of the Committee a midwifery department containing less than fifty beds cannot be satisfactory for the teaching of students, as it will not afford them an opportunity of seeing all the ordinary difficulties and complications of pregnancy and labour during the limited period of time in which they are attending the department. It would be impossible for every one of the existing teaching hospitals to supply such a large number of beds for midwifery. So it is obvious that under this scheme some form of concentration would be necessary, that is, that some of the hospitals should provide midwifery departments which would be attended by their own students, and in addition, by students from the hospitals which were unable to provide such departments.

(IV) Newly-founded *Centres* (Subsection II*b*) would probably be much larger than the "departments," on account of the urgent public need which exists for increased hospital accommodation for midwifery cases. They could provide about 200 beds each, of which roughly twenty would be for ante-natal conditions, 100 for labour, twenty for infective cases (isolation), and sixty for gynæcological cases. The provision of a certain number of such *centres* as these, in selected outlying districts, would form a most valuable contribution to the provision of an efficient maternity service for London. It is obviously of great importance that full use for teaching purposes should be made of such new *centres* when they come into existence.

The provision of a proportion of gynæcological beds in the *centre* is an essential feature of the scheme. It would be needed to meet the medical requirements of the district, and, further, it would allow the student to do his practical work in the two subjects together, and under the same teachers; knowledge of either subject is incomplete without the other, and the student learns them together much more readily than separately.

(V) The medical staff required to work the "Centre" also involves a new departure. Reasons have been advanced for the view that a much larger proportion of the teaching in the conduct of normal and abnormal labour should be given by senior obstetric officers, than is the case at present. This involves senior officers being either in residence at the Centre or on duty during certain definite hours of the day and night. Such services could not be required of them without payment upon an adequate scale. Next to them would be required assistants in residence, of the status of the present registrar or tutor, whose whole time would be required, and who also must be adequately paid.

(VI) "Departments" developing out of existing midwifery wards at teaching hospitals (Subsection II*a*) would probably be best staffed as follows:—

(1) A staff of two or more *Visiting Obstetric Physicians* (or surgeons) who would, in rotation, undertake the duties appertaining to the Director or Chief of the department, for definite periods as might be most suitable.

(2) A resident "*Chef de Clinique*," appointed for a term of years, who must be a whole-time officer, and who would have charge of the department under the visiting staff. His professional status should be above that of an obstetric registrar, i.e., comparable with that of a resident assistant surgeon or a resident assistant physician.

(3) One or two resident *Senior Assistants* of the status of a registrar, who would direct the students personally in their work in the labour wards, the lying-in-wards, and on the district, and a number of resident *Assistants* (house surgeons). These would also be whole-time officers.

Departments such as these would probably eventually develop into "Units" with professors of midwifery and gynæcology, on the lines of the units of medicine and surgery which are about to be founded. Such professors of midwifery and gynæcology should not be "whole-time" professors but should remain in touch with consulting practice.

(VII) New centres formed in outlying districts (Subsection II*b*) would probably be best worked by:—

(1) A resident *Director* or *Superintendent*, who might be appointed for a term of say five to seven years. He would be of the status of an obstetric physician at the teaching hospital. He would be responsible for the control of the work of the institution generally, and would take a large share in operative work, in teaching, and in research. The Director should not be a "whole-time" officer, but should remain in touch with consulting practice.

(2) One or more resident *Assistant Directors*.

(3) Working under (1) and (2) a sufficient number of resident

Assistants to direct the students personally in their work in the labour wards, the lying-in wards, the gynæcological wards, and in the district. They would also be responsible for the clinical pathology of the centre, and would carry out research under the supervision of the Director and the Assistant Director.

These appointments when first instituted, would afford an opportunity for the teaching hospitals affiliated to the centre to be represented upon its teaching staff, and thus keep the students in touch with their own hospital staff.

It must be borne in mind that outlying districts which are in need of a midwifery hospital service require general hospitals as well; these would, no doubt, eventually be established, and thus provide for the association of pathological and other services with the new Centres.

Such schemes would involve such heavy expenditure that they could not be put into operation without support from the State.

(VIII) In the opinion of the Committee the requirements of the students' training can only be completely met under the scheme of new "Centres," on account of the necessity which has been already emphasized of the senior teachers taking a considerably larger part than at present in the work of clinical instruction. Under the alternative scheme of "Departments" at existing teaching hospitals the senior teachers would, in effect, not take any larger part in teaching than they do now.

(IX) Students belonging to hospitals with a fully equipped midwifery Department (Subsection II*a*) should be attached to the Department for a period of four months during which their whole time would be devoted to midwifery and gynæcology, and they would be in residence for, at any rate, a part of the time. Students from other hospitals would probably come to the Department for practical midwifery only; they would be in residence for at least one month. In the second month they would attend their cases on the district of their own hospital under the supervision of their own medical staff, and would, in addition, continue to attend the Department for clinical teaching, operations, &c. These students would receive their gynæcological training at their own hospitals as at present.

(X) The midwifery districts of the teaching hospitals would therefore be continued, for it is of great importance that the student should have experience of district work during the latter part of his training, as long as it is under proper supervision. In the case of certain hospitals the district could not provide sufficient cases to enable each student to attend the required number. Arrangements could perhaps be made for a proportion of the students from these hospitals to do their district work elsewhere—i.e., in the district of another hospital.

(XI) Each teaching hospital should provide means of properly supervising its students in their work on the district. Under the present system the assistant obstetric physician is in nominal charge of this work, with the assistance of the registrar and the R.O.O. The control of the assistant obstetric physician should be made effective under the rules of each hospital, and the duties of the registrar should include the instruction of each student in the management of his district cases during the puerperium.

(XII) Students attending a new Centre (Subsection II*b*) would be attached to it for a period of four months during which their whole time would be devoted to midwifery and gynæcology, and they would be in residence for, at any rate, a part of that time.

G—First Steps to be taken.

(I) While the Committee are of opinion that eventually the foundation of new "Centres" will be necessary for the proper training of students in midwifery and gynæcology, it is recognized that it will probably be some time before such a scheme could be put into operation. The necessity of taking steps promptly to effect the most urgently needed improvements is however obvious, and the formation of "Departments" at existing teaching hospitals (F, Subsection II*a*) could be put into operation without prejudice to the later formation of new "Centres." In this way the two schemes could be developed side by side, and there is no doubt that the one found by experience to be best suited to the special requirements of London would eventually prevail.

(II) The development of fully equipped "Departments" at existing teaching hospitals, being the easier part of the scheme to put into operation, it might prove practicable to make a start forthwith.[1] This would be preferable to an attempt by all the hospitals to open midwifery wards of about the same size as the existing ones, which would result in too much dispersal of clinical material, and dissipation of effort on the part of the teachers. Further, wards of twenty beds or under are too small for the purposes required, which include beds for ante-natal and puerperal cases, while large wards would not be fully utilized at the smaller teaching hospitals except under some system of grouping teachers and students from different schools together.

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[1] Suggestions with regard to the distribution of such Departments will be found in Appendix C, p. 133.

(III) It is of great importance that a "Department" of the size indicated, formed at a teaching hospital, should in addition to their own students receive a certain number of students from one or more hospitals which have no midwifery ward. If this plan were carried out, the existing inequality of the training in practical midwifery in London which results from the absence of a midwifery ward in many teaching hospitals, would be to a great extent obliterated, and the general level of midwifery training would be at once appreciably raised.

(IV) As hospitals without a fully equipped midwifery department would continue to train their own students in gynæcology as at present, an immediate increase in the number of gynæcological beds at these hospitals is urgently required for the reasons which have been already stated.

(V) The first steps to be taken would probably be to inquire into the following points:—

(*a*) The possibility of the hospital designated being able to allot the required number of beds to midwifery.

(*b*) The willingness of other hospitals to make use of the "Department" for training their students.

(*c*) Suitable financial arrangements being made between the affiliated hospitals, assisted by a Government grant.

(VI) Another development which might be put into immediate operation is the much greater utilization of ante-natal and infant welfare clinics for the instruction of students.

(VII) It is also very desirable that all teaching hospitals should as far as possible compel their students to give up a minimum of four months solely to midwifery and gynæcology, and the Examining Bodies should be moved to alter their requirements in this sense.

In considering the length of time the student should devote to the subject, it must be recollected that the Committee propose that midwifery training should include work at ante-natal clinics and infant welfare centres. The latter work especially will in the future form so important a part of the duties of the practitioner of medicine that the Examining Bodies must make some provision for it in the curriculum. Obviously the best time is immediately after the study of obstetrics. There is the further advantage in making the study of the infant concurrent with, or immediately succeeding the study of midwifery, that the two together afford a concrete example of the methods of preventive medicine applied to the health of the community, which must impress itself on the student. Experience may show that four months devoted solely to midwifery, gynæcology, and the study of the infant, would not be long enough for the importance of these subjects in the health service of the community, and some extension would be then required.

H—The Teaching of Graduates.

Midwifery.

(1) There is no doubt that it is very desirable that provision should be made for the clinical instruction of graduates in midwifery; there is a considerable demand for it now, and this demand is likely to be greater in the future.

(2) The essential conditions for the practical instruction of graduates in midwifery are: (*a*) An institution able to receive large numbers of cases, and making special provision for difficult and operative labours; (*b*) resident teachers of status and experience.

(3) The case of the medical student is in our opinion more urgent than that of the graduate and should be dealt with first. When large central institutions on the lines indicated above have been set up, there will be no difficulty, in addition to meeting the needs of the students, to provide the clinical material, the teachers, and the laboratory facilities which are requisite for the instruction of graduates.

(4) Under the conditions which exist at present it is practically impossible to organize post-graduate instruction upon satisfactory lines. Certain suggestions for improving the existing facilities at lying-in hospitals will be found in Appendix D.

Gynæcology.

(1) The abundant clinical material of the special hospitals for women is largely lost for teaching purposes under the present conditions. A certain number of clinical assistants (qualified) are usually attached to them who attend out-patients and operations, but there are no systematic arrangements for clinical teaching upon a considerable scale.

(2) These hospitals would be of invaluable service in providing clinical teaching for graduates, and this appears to be their proper educational sphere.

(3) The three principal hospitals (Chelsea Hospital for Women, Samaritan Free Hospital, Soho Hospital) should be affiliated, so that graduates taking a course would be entitled to follow the practice of all

of them. In this way graduates taking a course of clinical gynæcology could be continuously employed in out-patient departments, wards, operating theatres and laboratories.

(4) Courses of Instruction lasting for six to eight weeks should be provided—viz., (*a*) clinical gynæcology; (*b*) operative gynæcology; (*c*) gynæcological pathology.

Clinical Gynæcology.—Demonstrations on selected cases should be given in the in-patient and out-patient departments, and the senior and junior members of the staff should take part in the teaching in both departments. Facilities should be afforded to each graduate to acquire a knowledge of the bi-manual methods of examination by repeated practice while the patient is anæsthetized; to acquire a knowledge of the instruments, appliances, &c., used in the practice of gynæcology. Case-taking cards should be provided in both in- and out-patient departments.

Gynæcological Pathology.—Instruction should be given in (*a*) recent specimens, (*b*) microscopic preparation, (*c*) bacteriology, (*d*) specimens in the Museum of the Royal College of Surgeons.

(5) Advanced courses might be arranged for those who desire to specialize in gynæcology, and opportunities afforded them both in the wards and in the laboratory for research.

(6) Clinical assistantships might still be available for those who, having taken a post-graduate course, desire to continue their work at the hospital.

Your obedient servants,

T. W. Eden (Chairman),
Henry Russell Andrews,
G. Blacker,
John S. Fairbairn,
F. J. McCann,
Gordon Ley (Secretary).

June 23, 1919.

APPENDIX A.

INQUIRIES MADE ON BEHALF OF THE COMMITTEE OF THE COUNCIL OF THE SECTION OF OBSTETRICS AND GYNÆCOLOGY OF THE ROYAL SOCIETY OF MEDICINE.

N.B.—It is requested that answers be made on pre-war working, but that additions or improvements (if any have been made during the War) be included.

Question I.—The total number of beds in the hospital?

Question II.—(*a*) Number of gynæcological beds?
(*b*) Number of obstetrical (including ante-natal) beds?

Question III.—Number of deliveries per annum:—
(*a*) In the wards?
(*b*) On the district?

Question IV.—Total number of students per annum doing midwifery and gynæcology; also
Total number of midwives trained per annum?

Question V.—Time given by students to training:—
(*a*) Gynæcological clerking { (1) In-patient? (2) Out-patient?
(*b*) Midwifery . . . { (1) In-patient? (2) Out-patient?
Do these run concurrently or not?

Question VI.—What instruction is given to students:—
(*a*) In the midwifery department?
(*b*) In the ante-natal department?
(*c*) Or elsewhere?
Before taking duty on the district.
By whom is it given?

Question VII.—What supervision of the students is provided in the out-patient midwifery department?

Question VIII.—Average number of cases delivered by each student:—
(*a*) In the wards?
(*b*) On the district?

Question IX.—By whom are complicated cases of labour—e.g., eclampsia, ante-partum hæmorrhage, &c.—dealt with:—
(*a*) On the district?
(*b*) In the hospital?
Are all such cases admitted to hospital for treatment, and what arrangements are made for teaching in these cases?

Question X.—Have you a maternity and infant welfare department? If so, by whom is the work done, and is teaching given to students?

Question XI.—Are cases of puerperal infection admitted to the gynæcological wards, or to a special department, and what teaching is provided on these cases?

Question XII.—What clinical instruction in gynæcology is given:—
(*a*) In the wards?
(*b*) In the out-patient department?
(*c*) By whom is it given in each case?

APPENDIX B.

I.—TABULATED ANSWERS TO QUESTIONS IN APPENDIX A.

Hospital	Beds			Deliveries		Numbers trained		Period of training		Numbers of cases delivered by each student		Maternity and Infant Welfare department
	Total	Gynæ.	Obst.	Wards	District	Students	Midwives	Gynæ.	Obst.	Wards	District	
(I) Charing Cross ...	250	18	—	A few abnormal	166	12	—	2 months†	1 month†	—	20 + Q. C. H.	+
(II) Guy's	643	24	8*	115 mostly abnormal	2,209 986	65	30	3 months†	3 months†	—	35	Starts in October, 1919
(III) King's College	360	14	—	A few	—	25	—	3 months†	3 months†	—	—	—
(IV) London ...	925	34	10*	250* 70 abnormal	2,033 1,884	63	48	2 months	1 month	—	25	—
(V) Middlesex ...	480	20	10*	370*	460	21	28	3 months	1 month	—	22	—
(VI) Royal Free ...	170	16	24	354	178	40	—	3 months	6 weeks	8	5	+
(VII) St. Bartholomew's	670	26	16	300	1,200	100	8	3 months	1 month	6	18	—
(VIII) St. George's...	336	20	—	A few	200	25	—	2 months†	1 month†	—	20	—
(IX) St. Mary's ...	306	13	—	A few	—	35	—	3 months†	1 month†	—	—	+
(X) St. Thomas's ...	592	29	21	550 to 600	1,000	50	2-10	3 months†	3 months†	9	20	+
(XI) University College	305	20	8	182	1,324	40	11	2 months	2 months	Very few	20	+
(XII) Westminster ...	213	11	—	12 all abnormal	131	12	—	3 months	1 month	—	Under 20 + York Road Lying-in Hospital	—

* Reserved for midwives. † Run concurrently.

Q. C. H. = Queen Charlotte's Hospital. C. L. M. H. = City of London Maternity Hospital.

(II) Epitomized Answers to Questions in Appendix A.

No. VI.—The replies to this question indicate that three different systems are followed in different hospitals:—

(*a*) Preliminary instruction in lying-in wards of the hospital, after which the student is taken to his first one, two, or three cases by the R.O.O.

(*b*) The preliminary instruction is given at a lying-in hospital; this however in practice is nominal only and of little practical value.

(*c*) No preliminary practical instruction, but special classes or demonstrations given to students by the R.O.O. before attending their cases on the district.

No. VII.—No details are furnished in eleven of the reports. St. Bartholomew's is the only hospital which attempts to provide any systematic supervision.

No. IX.—In most of the reports it appears that there are no definite arrangements for the cases being in all instances seen and treated by the visiting physicians; in three reports it is definitely stated that all such cases are seen and treated by the visiting physicians (St. Bartholomew's, St. George's, St. Mary's).

No. XI.—Cases of general puerperal septicæmia are admitted:—

(1) To the gynæcological wards only—one hospital.

(2) Some to gynæcological wards, some to isolation wards—six hospitals.

(3) All to isolation wards—three hospitals.

(4) Refused admittance—one hospital (lack of accommodation).

Cases admitted to isolation wards are not as a rule available for obstetric teaching; in three cases it is stated that such teaching is given.

No. XII.—Gynæcological teaching in the wards is given as a rule by the honorary officers either "occasionally," once, twice or thrice a week. In two cases the obstetric registrar also teaches in the wards three and four times a week. Clinical lectures, demonstrations under anæsthesia, and teaching during operation are also mentioned in most cases. In one hospital a course of "demonstrations" is given to "junior" students by the visiting gynæcologist before they clerk in the wards. Gynæcological teaching in out-patient departments is given usually twice a week; in one case four times a week; as a rule the in-patient obstetric physician is not engaged in this teaching, only one exception being mentioned.

APPENDIX C.

It is the larger teaching hospitals that would probably be able with the least delay to develop fully equipped midwifery "Departments" on the lines suggested in Section F, viz.:—

Guy's Hospital	643 beds
London Hospital	925 beds
St. Bartholomew's Hospital	670 beds
St. Thomas's Hospital	592 beds

It is hoped that two others would also be able to take similar steps, viz.:—

Either Middlesex Hospital	480 beds
or University College Hospital	305 beds
and Royal Free Hospital	184 beds

Six fully equipped "Departments" would be able, without difficulty, to receive among them the students from the remaining six teaching hospitals which have no midwifery wards of their own. The manner in which the hospitals were grouped for this purpose would probably be mainly determined by proximity, and the arrangements might well be left to the initiative of the hospitals concerned. The department at the Royal Free Hospital might prove to be specially suitable for women students from other hospitals where women are received for training.

According to figures prepared by the General Medical Council the total number of medical students in London schools due to qualify annually during the next four years is as follows: In 1920, 324 students; 1921, 424 students; 1922, 463 students; 1923, 546 students. The requirements of 600 students per annum could be met if six "Departments" of fifty midwifery beds each were established at teaching hospitals; this would probably allow an average of over eight cases of labour for each student trained.

It is questionable whether financial assistance from the Government would be forthcoming for the *permanent* establishment of so many midwifery "Departments" in the central districts where, from the point of view of the public needs, not all of them would be required, although they would perhaps do so as a temporary measure. It is specially in the outlying districts that a midwifery hospital service is needed, and before long this will no doubt be established; there will not then be the same need for midwifery "Departments" in the central districts, and their number would no doubt be reduced.

Post-Graduate Teaching.—Advantage should be taken of the close proximity of Queen Charlotte's Lying-in Hospital and the Samaritan Free Hospital for Women, to amalgamate these two hospitals and form a post-graduate school of midwifery and gynæcology.

APPENDIX D.

THE CLINICAL TEACHING OF POST-GRADUATES IN MIDWIFERY (DR. F. J. MCCANN).

(1) The existing lying-in hospitals should be utilized for the teaching of midwifery to post-graduates as well as midwives, and arrangements made so that facilities are afforded for acquiring a practical knowledge of the conduct of labour and obstetric operations.

(2) Lecture demonstrations should be given on (*a*) the anatomy of labour, (*b*) obstructed labour, (*c*) puerperal infection.

(3) Demonstrations should be given on the technique of obstetric operations.

(4) Clinical instruction should be given in the wards and out-patient department, and occasional lectures delivered on such subjects as the toxæmias of pregnancy, cardiac disease complicating pregnancy, &c.

(5) Instruction should be given in the diseases and deformities of the fœtus, and for this purpose the valuable collection in the Royal College of Surgeons Museum should be made available.

(6) Well equipped laboratories should be provided at the lying-in hospitals, where instruction would be given by the pathologist, and opportunities provided for research work.

(7) The courses of instruction in midwifery should last from four to six weeks.

(8) A resident officer above the rank of a house surgeon should be appointed at the lying-in hospital to assist in the teaching.

Section of Obstetrics and Gynæcology.

President—Mr. J. D. Malcolm, C.M.

A Fœtus undergoing Spontaneous Evolution removed by Laparotomy during Labour.[1]

By Clifford White, F.R.C.S.

L. A., aged 34, had had four previous uncomplicated deliveries. The average weight of these children is stated to have been 9 lb. Her fifth labour commenced at term at 3 a.m. on October 18, 1916; at 10 a.m. on the same day a midwife ruptured the membranes. On October 19 the pains ceased, but on the 20th strong contractions recommenced, and at about 4 p.m. a doctor was sent for on account of the left shoulder presenting. He failed to perform version under anæsthesia, and sent her from Wood Green to Queen Charlotte's Hospital where she arrived about 9.45 p.m. One-third of a grain of morphia was administered soon after admission. I saw her shortly after 10 o'clock; she then complained of constant abdominal pain, her pulse was 120 and her general condition bad. The uterus was in a state of continuous contraction, the vulva was œdematous and there was an offensive vaginal discharge. The pelvis was not contracted. The left arm was the lowest presenting part, but both arms, the right leg and the cord were prolapsed into the vagina. The cord was not pulsating. The head was high up and quite out of reach, the buttocks were at the fundus, which was displaced to the mother's left side. The lower uterine segment was tense and thinned.

It was obvious that an attempt to introduce the hand into the uterus would rupture it, and it was equally obvious that abdominal section must be attended by grave risk. Morphia had already been given, and

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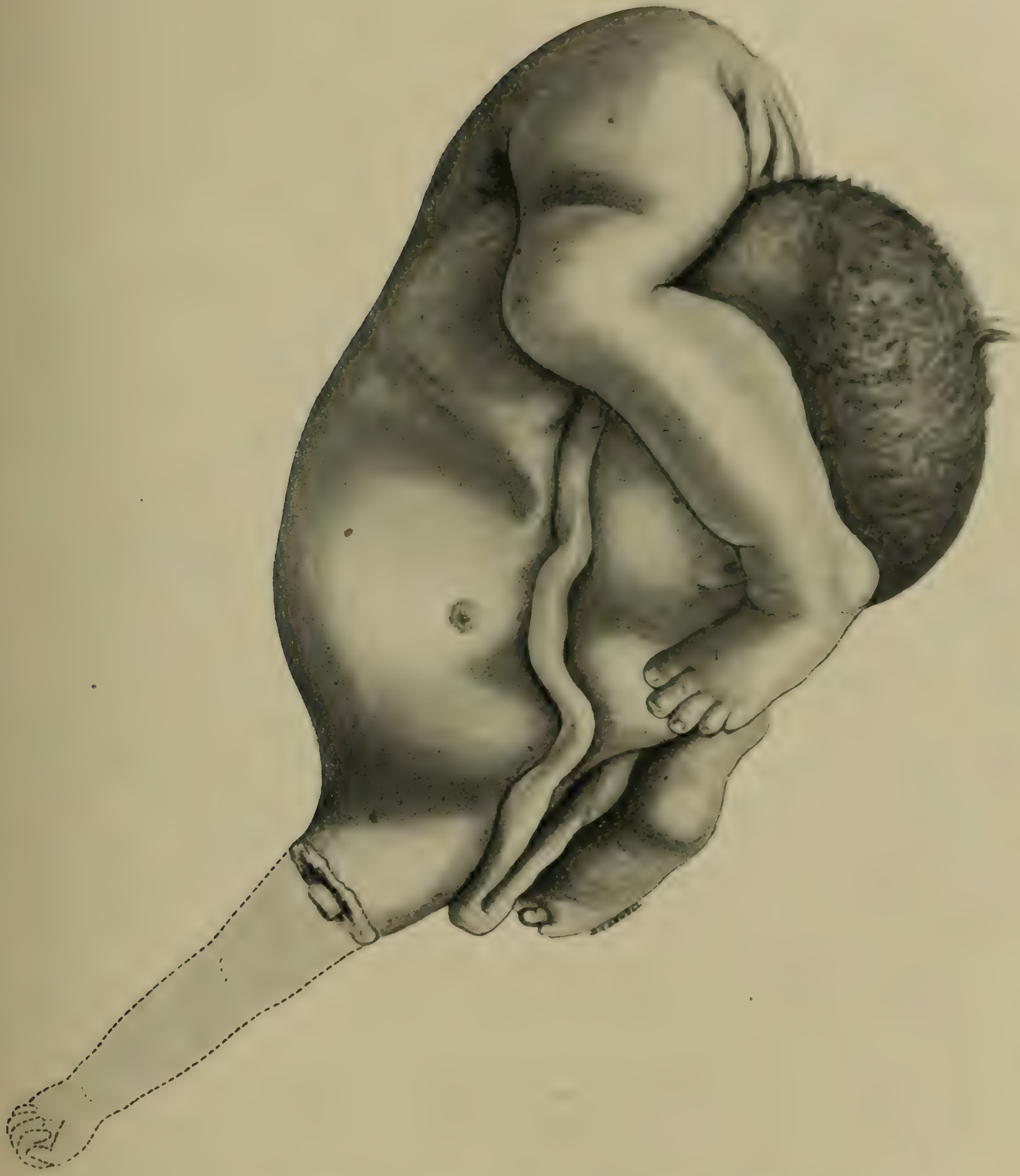
[1] At a meeting of the Section, held April 3, 1919.

no further relaxation of the uterus could be expected, so I amputated both arms and made weight traction by attaching a 7-lb. weight to the foot for three-quarters of an hour while waiting for the preparations to be made for operation. The weight traction had little effect and so, at 11.30 o'clock—nearly seventy hours after the commencement of labour —I opened the abdomen. The pouch of Douglas contained blood-stained fluid, the lower uterine segment was tense and thinned and the uterus as a whole would not come up out of the pelvis during the subsequent operation. The retraction ring of Bandl could not be distinguished on the outer surface of the uterus but the bladder was considerably drawn up. I turned the uterus forwards without opening it and packed the intestines off and covered the upper part of the incision with towels. The gravid uterus was then excised, curved clamps being put on to the vagina (as far as the prolapsed arm-stumps would allow) in an attempt to prevent infected fluid oozing from the uterus. As the lowest clamp was about to be put on, the uterus slowly underwent the process of rupture. It was possible to observe this process, which was as follows: The peritoneum covering the right side of the lower segment cracked into pieces about 2 cm. across, a little blood appeared at the cracks and then the muscular tissue yielded gradually and allowed portions of the fœtus to be seen. Fortunately the operation was nearly completed and so the vagina was cut across and the uterus with contents removed without delay. I was surprised to find that the left uterine vein was completely thrombosed and that on the right side was partly thrombosed. The peritoneal flaps were united over the vagina and the abdomen closed. The duration of the whole operation was twenty-seven minutes and infusion of saline solution was done throughout. The patient recovered consciousness and power of speech and even drank some warm coffee, but died suddenly three hours after the termination of the operation.

The specimen was hardened in formalin so that the original shape was accurately preserved. The fœtus is of the usual size of a child at term, it is so bent on itself that the usual fœtal oblong is replaced by a more globular mass. The cervical spine is flexed to its fullest extent so that the child's head is embedded in the abdomen and the right parietal eminence is in contact with the pubes. Both arms are prolapsed below the neck and they are forced together so that there is a space of only 2 cm. between the shoulder-joints. The right leg is extended and the toes are on a level with the humerus of the prolapsed arm. The left foot is in contact with the left ear.



Full-time fœtus undergoing spontaneous evolution. The gravid uterus was excised unopened during labour and the specimen hardened with the fœtus in its original posture.

The arms have been amputated—the right above the elbow and the left just below the shoulder.

The irregular mass formed by the contorted child measures 19 cm. transversely from the vertex to the lower dorsal spines, 17·5 cm. from before back and 27 cm. in its greatest length along the right leg. The compression to which the child had been subjected was so great that depressions have formed in places where fœtal parts are in contact. This is even the case where the cord runs across the chest and shoulder. On the outer surface of the fœtus there is a groove running round at the level of the axilla and another at the level of the neck. These were probably caused by uterine action.

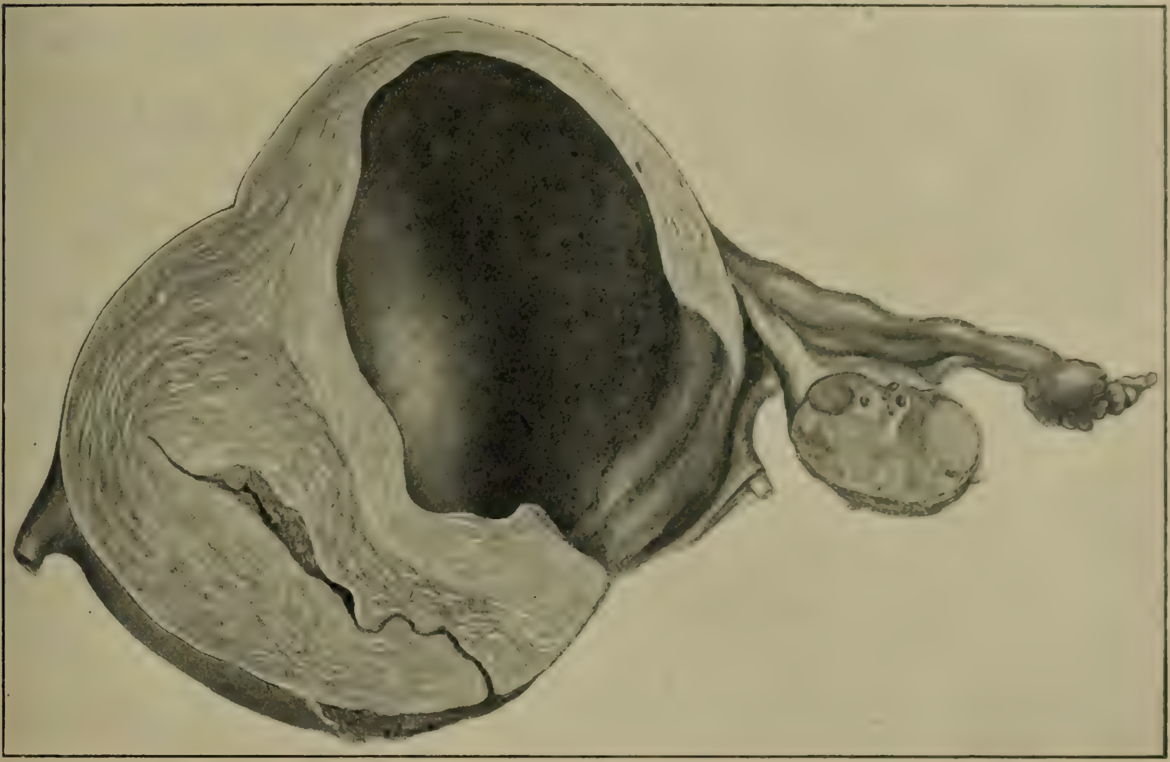
The specimen shows the condition of the fœtus during spontaneous evolution. The efforts of the uterus to overcome a transverse presentation by this process failed probably partly because of the increased difficulties occasioned by the prolapsed extended right leg and the fact that both arms were in the vagina.

A Case of Full-time Pregnancy in a Rudimentary Uterine Horn.

By Clifford White, F.R.C.S.

This specimen was given to me for investigation by Dr. Angus Kennedy, my colleague at St. Mary's Hospital for Women, Plaistow. The lady from whom the specimen was removed was aged 27. She had had one normal labour in 1915. Her periods were regular till February 22, 1917, when they ceased suddenly. In October, 1917, some blood-stained discharge was passed *per vaginam* but fœtal movements were felt up till, but not after, November. Pain was never marked but as labour did not come on a bougie was passed into the uterus in January, 1918, and then the cervix dilated under anæsthesia. It was found that the uterus was small and empty, but a mass as big as the gravid uterus at term could be felt above and to the right. On January 30 Dr. Kennedy performed Cæsarean section and removed a dead male child, which was of full size and well formed. The uterus was then removed by subtotal hysterectomy, the appendages on the right side being removed with it. No signs of impending rupture were noticed. The patient made an uneventful recovery.

When first given me the specimen was a good deal bigger than it is now, as considerable shrinking has taken place during hardening; it was originally about one and a half times the size of a uterus after an ordinary Cæsarean section and the walls of the gestation sac were more flaccid than usual. It consists of the body of the uterus, the gestation sac, the right tube and ovary and the stumps of both round ligaments. The body of the uterus is pushed downwards and to the left. In its present state it measures 9 cm. long; its cavity is 7 cm. long, it is not dilated, but only contains a small quantity of reddish material which on section is found to be chiefly decidual débris. Above and to the right of the uterus is the gestation sac which measures 12 cm. by 11 cm. by 9 cm. The placental site is on the left or uterine side of the cavity. Microscopic sections of the sac wall show little decidual change. The walls of the gestation sac measure from 0·8 cm. to 2·4 cm. in thickness except on the uterine side where 2·5 cm. to 4·5 cm. of tissue separate the two cavities. The round ligaments are at the extreme right and left limits of the mass; the point of insertion



Uterus and gestation sac from a case of full-time cornual pregnancy removed by operation two months after the date of the death of the fœtus. Recovery.

of the right round ligament is just 4 cm. from the attachment of the ovarian ligament, and 3·5 cm. from the insertion of the tube. The right ovary contains a corpus luteum which measures 16 mm. by 11 mm. The tube appears to be healthy and no peritubal adhesions are present. Near the point of its insertion the wall of the gestation sac is much thinned, but the peritoneum covering it is intact and there are no signs of rupture. The position of the round ligament indicates that the specimen must be either from a case of pregnancy in a rudimentary horn, or else an interstitial ectopic pregnancy. From the small size of the uterus and the proximity of the points of origin of the tube, ovarian ligament and round ligament, it would seem that the present specimen is one of pregnancy in a rudimentary cornu.

I may add that in the last seventeen years Dr. Kennedy has operated on five cases of full-time ectopic pregnancies with four recoveries.

Two Cases of Full-time Extra-uterine Pregnancy, with a Tabulated Abstract of 100 Cases from the Literature.

By Gordon Ley, F.R.C.S.

In June of last year I had the good fortune to be able to treat two cases of full-time extra-uterine pregnancy. These two cases, and the conclusions drawn from them and from a study of the literature of the subject, form the subject matter of my paper to-night.

I propose first to read the histories, notes of examinations and operations, and to describe the pathological specimens of my two cases; secondly, to review tables based on 100 cases from the literature; and thirdly, to open a discussion on the treatment of these cases. I hope we may be able to lay down more or less defined rules along which cases of extra-uterine pregnancy at term should be treated.

The first case came to the London Hospital out-patients early in June and was admitted to hospital on June 15, 1918. Her notes are as follows:—

E. L., aged 36. One child, fourteen years ago; no miscarriages. Catamenia had been regular until December, 1911, after which she saw nothing until October, 1912. In October, 1912, she had a period, during which the loss was excessive. There were no further periods until January, 1913; since then she had been perfectly regular, the flow lasting four days and occurring at monthly intervals. There was no pain during the period from December, 1911, to January, 1913, as far as her memory will serve. The abdomen enlarged between December, 1911, and October, 1912, at which time she was much bigger than she was with her first baby. Since October, 1912, she has got smaller, but a lump has persisted ever since. It decreased in size rapidly at first but has remained at its present size for years. She felt the baby during April and June, 1912, but did not feel it after that time. There was some vomiting during the early part of the period, December, 1911, to October, 1912. She is doubtful if there were any breast changes, but her memory is not good. During the last three months, March to May, 1918, she has complained of pain in the back and of considerable loss of weight.

On abdominal examination there is a stony-hard mass lying across the mid and lower abdomen; it is somewhat of the shape of a fœtus in the normal attitude, lying transversely with the head to the left and the breech to the right. The abdominal parietes grate against the mass on palpation. The mass extends a distance of two fingers' breadth above the umbilicus, it rises out of the pelvis, the part of it just above the brim and in the pelvis being considerably softer than that above.

On vaginal examination a normal cervix and lower uterine segment can be defined; above this it is impossible to define the uterus. In Douglas's pouch there is a soft fixed mass, which completely fills it.

A confident diagnosis of full term, extra-uterine pregnancy was made and was confirmed by an X-ray photograph which shows the fœtus clearly, lying with the breech to the right and its head to the left.

On June 17 the abdomen was opened. There were many adhesions of omentum to the front of a sac which was white, tough and pock marked. The omentum was ligatured off and cut away. Apart from these omental adhesions, the sac was free anteriorly with the exception of one adhesion to the bladder and several slight adhesions to the back of a small uterus which lay below and to the right of the sac. The left Fallopian tube was identified crossing the front of the sac well below the pelvic brim and apparently terminating in the sac. Posteriorly the pelvic colon was firmly adherent to the back of the sac crossing from the region of the left ovario-pelvic ligament to the right side of the sac; from this point the colon passed downwards, being adherent to the right posterior wall of the sac in its whole depth. The colon was separated from the sac without much difficulty except at one point low down on the right where the sac was opened and material resembling placenta protruded. The sac was last separated from the floor of the pelvis and was then removed with the left tube and ovary, a normal right tube and ovary being left, together with the atrophic uterus.

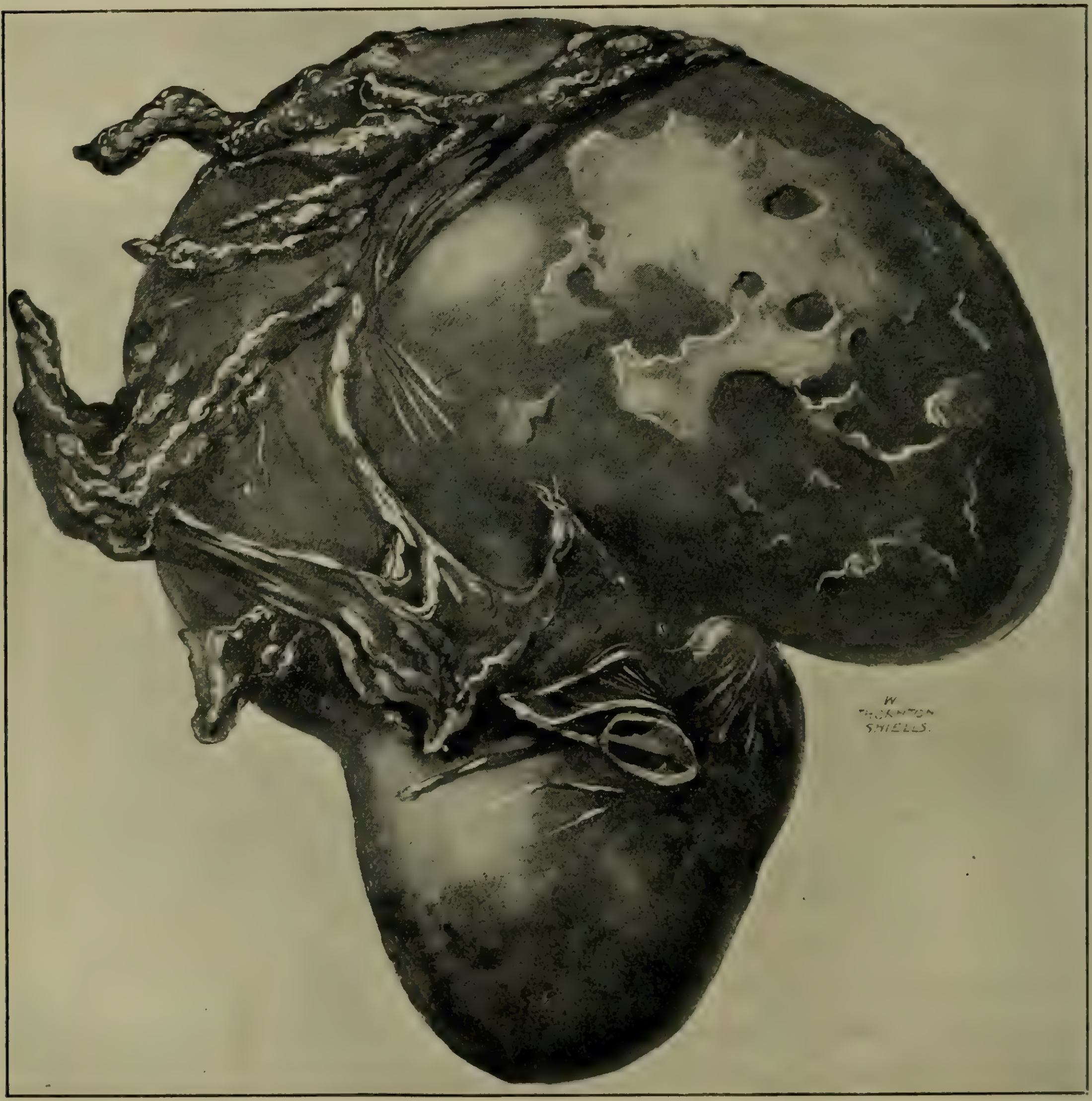


Fig. 1.

Anterior view of sac from Case I showing relationship of left tube and ovary.

The convalescence was absolutely undisturbed and the patient returned home on the sixteenth day after her operation.

PATHOLOGICAL DESCRIPTION.

Specimen from E. L.—The specimen is a mass 20 cm. by 18 cm. by 13 cm. It is shaped like the African continent, the west side pointing however to the east. Its surface is greyish-white in colour and is irregular and pock-marked, being covered by plaques of fibrin. To its right anterior and right posterior upper parts large omental strands are attached. Lying at its equator, in front of the mass, is a structure

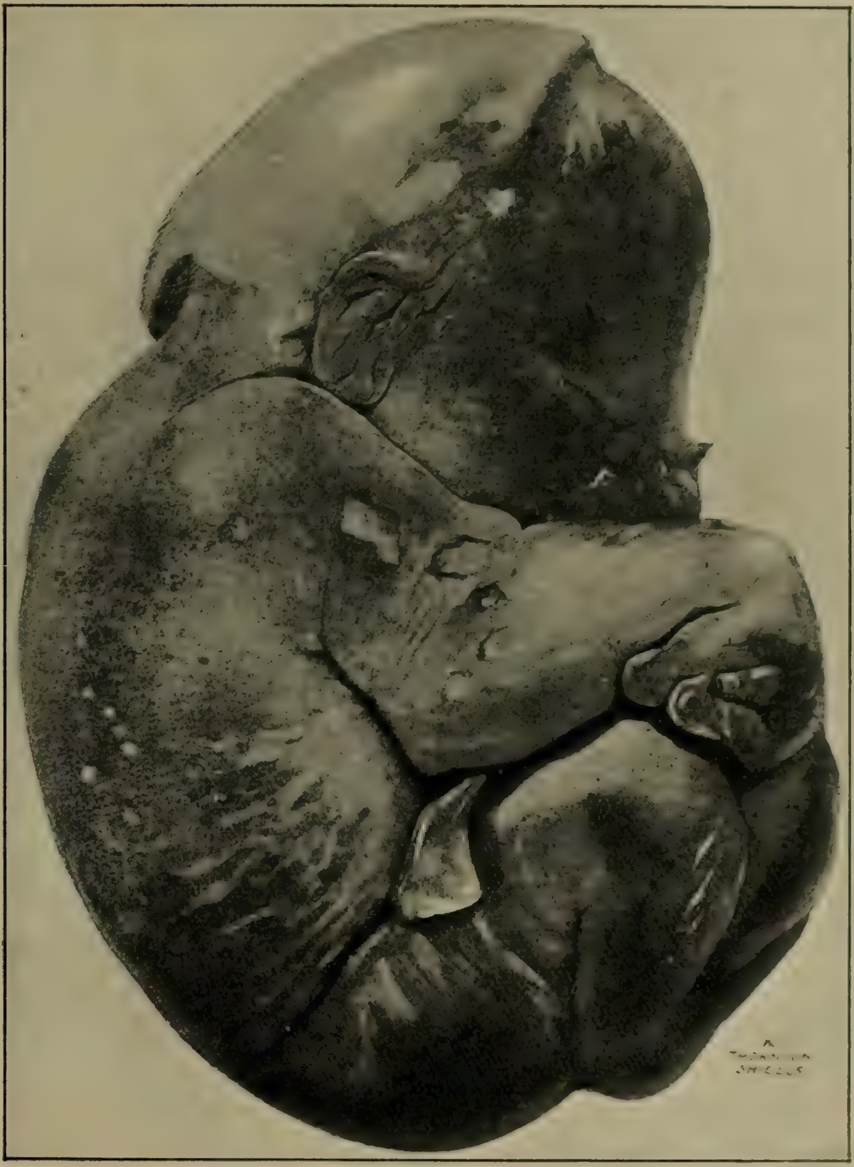


FIG. 2.

Fœtus from Case I.

covered by vascular fibrous tags. This structure consists of the left Fallopian tube, upper left broad ligament and left ovary. The tube measures 7 cm. long by 0·4 cm. in diameter, in its proximal 4 cm.; beyond this it is intimately blended with and apparently terminates in the mass. The ovary measures 2·2 cm. by 1·6 cm. by 1 cm. It contains one small cyst 1 cm. by 1 cm. by 2 cm., the walls of which are lined by laminated clot. On the right side of the posterior wall of the lower pole of the tumour a process of soft papillary light brown tissue projects from inside the mass. This measures 4 cm. by 3 cm. by 3·5 cm. On opening the mass it is found to consist of a sac containing a fœtus and placenta. The sac wall varies from 0·01 cm. to 0·5 cm. thick. The part above the equator has a comparatively smooth brownish lining. Its wall is ridged, the ridges marking the site of the fœtal folds. This part of the sac contains the fœtus. A rough area on the posterior wall of the sac, measuring 3 cm. by 2 cm. and 2 cm. above the equator, marks the point of insertion of the umbilical cord. The part of the sac below the equator contains a dark brown papillary friable mass which represents the placenta. This posteriorly and to the right has perforated the sac wall and projects externally as formerly described. The fœtus weighs 3 lb. 1 oz. It is bunched into a position of extreme flexion and compressed to the smallest possible bulk, the feet and hands being flattened. The state of preservation is extraordinarily good. The hair on the scalp is still present, and is light brown in colour. Here and there are superficial ulcers floored by yellow gritty tissue.

The above description shows clearly that this was a case of secondary abdominal pregnancy; the ampulla of the left tube being the primary site of the gestation sac. The tube had apparently given way posteriorly and the fœtus and membranes had passed through the rent into the peritoneal cavity. The placenta has in part remained *in situ* and in part become attached to all structures forming the floor of Douglas's pouch.

The second case I saw at the Cottage Hospital, Walton-on-Thames, on June 26, 1918:—

D. R., aged 28. Married three years and three months; no children and no miscarriages. Her previous health had been good until two years ago, since that time there had been pain in the left lumbar region which was clutching in character. This pain was intermittent and was usually associated with pain in the vagina. The pain persisted on and off until November, 1917, and since then she has not suffered from it. It was sometimes absent for as long as six months. During the periods of pain there was frequency of micturition. The condition was diagnosed as a colon bacillus infection of the urinary tract. Her menstrual periods were regular, lasting four to five days every month, up to October, 1917, but since then she had not seen her periods. On November 20, six weeks after the cessation of menstruation, she had a very severe attack of abdominal pain, lasting three days; which was felt all over the lower abdomen. The pain was exceedingly severe and she fainted on two or three occasions; it was accompanied by a slight show. She was in a nursing home for about a week at this time. Her temperature ranged from 97·6° F. to 100° F., and the pulse from 80 to 100. There were two less severe attacks in January and again in April, 1918. Ever since the November attack there has been slight pain in the right lower abdomen and the back, which has been more of the nature of a sore feeling and has been practically constant; it has been getting worse for the past few weeks. She first felt the baby when sixteen weeks over her time, and from that date onwards to June 25. She has not felt the child since this time. Micturition has been unaffected; the bowels have been constipated for the past month. Since June 26 she has felt ill and the pain in the back has become distinctly worse. Her temperature has ranged from 98° F. to 100·4° F., and the pulse from 80 to 108. The breasts have increased in size since November, 1917, and her abdomen has also greatly increased in size since that date. There was a slight show on June 26 and it recurred again on July 2.

On examination on July 2, the following points were noted: A wasted ill-looking woman, anæmic and slightly jaundiced; temperature 100·4° F., pulse 120; the tongue furred and dry. The abdomen is distended and shows numerous striæ gravidarum. A very large tumour occupies the abdomen, rising out of the pelvis; it is situated very plainly to the right of the mid-line and reaches the costal margin. It extends only about three fingers' breadth to the left of the mid-line at the umbilicus. The tumour is tender and is definitely cystic: it does not contract on examination. No fœtal parts can be felt and no fœtal heart can be heard. There is a uterine souffle in both iliac fossæ. To the left of the tumour attached to it, there is a mass rising out of the pelvis to about the level of the umbilicus. This mass, to the right, is continuous with the tumour in its whole length. It can definitely be made to contract on stimulation and behaves in every way exactly like a puerperal uterus on the day following delivery; it is also about that size. The examination is rendered extremely difficult by a distended, transverse and pelvic colon and by general tenderness. The breasts showed a well formed primary and secondary areola and much milk can be squeezed from the nipples.

Vaginal examination: There is no discoloration of the vulva, the parts are soft and vascular as at full term. The cervix is soft and enlarged, it is extremely far up the vagina and is displaced very distinctly to the left by a tender mass which pushes down the right side of the vaginal vault.

With this history and these physical signs, the only possible diagnosis appeared to be that of a full-term pregnancy in the right broad ligament, and it was advised that the patient should be transferred to a London nursing home. This was done on the following day. An examination of the urine revealed a small amount of albumin and a very large number of granular casts. There were no pus cells but there were numerous staphylococci and streptococci present. Her general condition was reported on favourably by a physician.

On July 3 there was a show, which was, however, extremely slight. The physical signs on abdominal examination remained the same, with the exception that the colonic distension diminished and allowed of the more easy recognition of the two parts of the abdominal tumour. The uterine mass gradually diminished between the 4th and the 16th, at which time it was about the size of a ten weeks' pregnancy. Contractions and relaxations of the uterus were elicited at each examination. Her general condition between the 4th and the 16th improved. Vomiting, which had been pronounced from June 26 to July 4, ceased on relief of the intestinal distension. The temperature, however, remained from between 98·4° F. to 100° F., the pulse falling to 100 to 110. The pain in the back also persisted. These complications, combined with the possibility of further adverse manifestations arising at any time, seemed to indicate operative treatment.

After examination under an anæsthetic and still further confirming the diagnosis, the abdomen was opened on July 16, the child having then been dead about twenty-one days. On opening the abdomen it was seen that the condition exactly corresponded with the physical signs. The uterus was displaced to the left and was about the size of a ten weeks' pregnancy. The left tube was thickened and tortuous but was apparently patent. The left ovary was normal. Attached to the right of the uterus was an enormous mass covered entirely by peritoneum and showing large vessels coursing over it. The right round ligament crossed the tumour passing from the right cornu downwards and to the right. The right tube was lost on the surface of the tumour. There were many adhesions of omentum to the upper anterior and to the right and upper pole of the tumour. The pelvic colon was firmly adherent to the back of the tumour as far down as could be reached; it was also adherent to the back of the uterus. The cæcum was adjacent to, and was bound by a few adhesions to the right side of the sac; the right ovario-pelvic ligament being completely obliterated, the vessels passing directly out from underneath the cæcum on to the front of the tumour. The union of the uterus to the left wall of the sac was extremely firm and had a depth from before backwards of at least 2 in.—that is, it was too broad to clamp.

The right round ligament was divided in about its centre and an incision was made from here, through the peritoneum to the right wall of the uterus in one direction and to a point 1 in. below the ovarian vessels in the opposite direction. The round ligament was then stripped up to the uterine cornu and an attempt was made to get between the uterus and the sac in the hope of saving the former structure. A large blood sinus was at once encountered and bleeding from it was only controlled with extreme difficulty. It was obvious therefore that the uterus would have to be removed. The left round ligament, the left tube and ovarian ligament were clamped and divided, and the left side of the uterus freed in the ordinary way. The pelvic colon was next separated from the back of the uterus, the left uterine vessels were then divided between clamps and ligatured and the supravaginal cervix was cut across. Some right uterine vessels were then clamped. Previous to this, the bladder had been displaced downwards from the front of the sac and from the uterus. The sac was next separated from the floor of the pelvis, this part of the dissection being carried out satisfactorily, many large vessels being encountered and clamped. The dissection was carried backwards and to the right until the bowel was approached. The cæcum was then separated from the sac and the ovarian vessels clamped as they passed out from underneath it. At this point the sac ruptured and the baby was expelled. The cord was cut and the baby removed. The sac was now almost completely free with the exception of its posterior part which was firmly adherent to the pelvic colon. It was cut away, a small area of its wall being left where the pelvic colon and rectum were adherent to its posterior surface. Complete hæmostasis was next secured and the floor peritonealized, the edges of the sac, which now formed the face of the pelvic colon and rectum, being sutured to the anterior and posterior leaves of the broad ligament, the pelvic colon thus forming a horizontal line stretching from right to left. The abdomen was closed, a small drainage tube being inserted which was removed twenty-four hours later.

The patient stood the operation extremely well. There was of course severe shock and there was no small amount of blood lost. The difficulties encountered were considerable owing to the absolute impossibility of controlling the blood supply before dissection. It had been hoped that it would be possible to save the uterus and to clamp the ovarian vessels before commencing dissection, but this, as has been seen, was absolutely impossible.

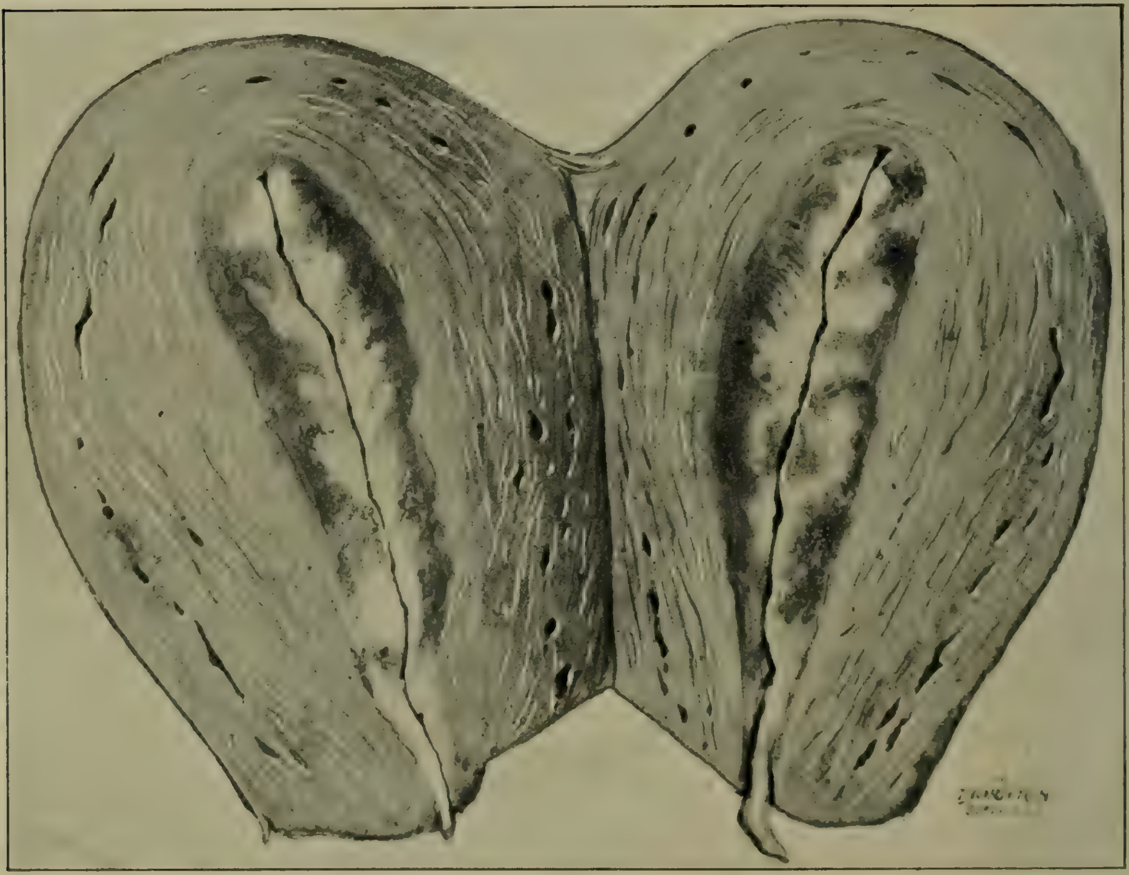


Fig. 3.

Vertical antero-posterior section of uterus from Case II, showing decidua.

Convalescence was undisturbed until the ninth day, when the temperature rose and remained up until the seventeenth day. On the eleventh day the patient developed a right uretero-cervical fistula which persists at the present time. Apart from this she is in perfect health and will probably at a later date have a right nephrectomy performed upon her.

PATHOLOGICAL DESCRIPTION.

Specimen of D. R.—A specimen measuring 27 cm. by 18 cm. by 9 cm. It consists of two parts: (*a*) a uterus, (*b*) a sac. The uterus has been amputated through the upper part of the cervix; it measures 8·5 cm. by 9·5 cm. by 6 cm. Its surface, particularly posteriorly and superiorly, is covered by fibrous tags. The wall is 3·5 cm. thick, the inner 1·2 cm., consisting of a soft grey or pinkish decidua in which are yellow dotted areas. The left appendages and left round ligament are not included in the specimen, but their stumps are seen in the region of the left cornu. Running from the right cornu is the stump

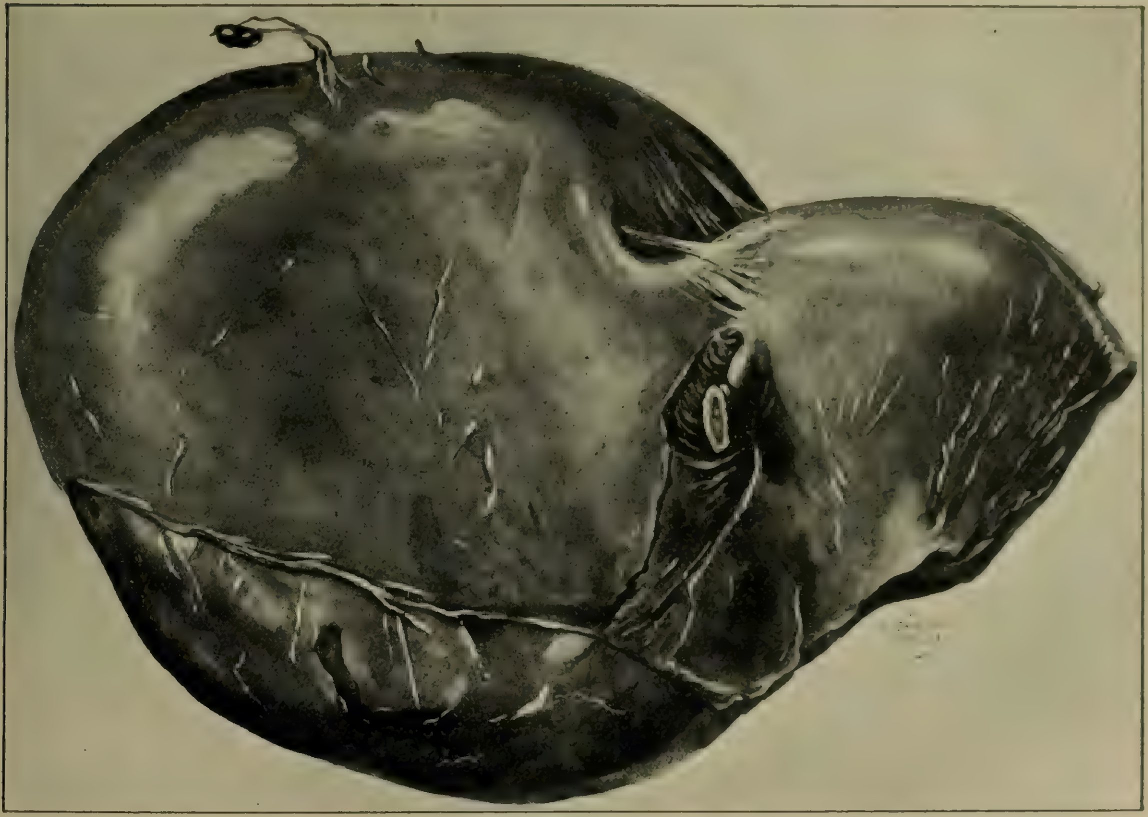


FIG. 4.

Anterior view of uterus and sac, Case I, showing right round ligament, right tube and line of peritoneal incision.

of the right round ligament, measuring 3·5 cm. by 1·5 cm. by 0·7 cm. The right Fallopian tube passes out on the surface of the sac a distance of 3 cm.; it then turns upwards a further 2 cm., and is here lost on the surface of the sac. The tube has a diameter of 1 cm. and posteriorly and inferiorly is incorporated with the sac. The sac measures 18 cm. by 18 cm. by 9 cm. It is firmly attached to the right and posterior-right wall of the uterus in the whole length of the former and over a depth of 6 cm. The upper two-thirds of the sac are covered by peritoneum to which a few omental tags are attached. The lower third is devoid of peritoneum. Beneath the peritoneum numerous blood-vessels can be seen. Posteriorly there is a big foramen 15 cm. in diameter which opens up the sac. The sac is found to have a wall varying from 0·2 cm. to 0·5 cm. in thickness. It is lined by a rusty brown, soft, slightly wrinkled membrane. To its right anterior, external and upper wall, an irregular placenta is attached; this varies greatly in thickness, having a maximum thickness of 1·6 cm.

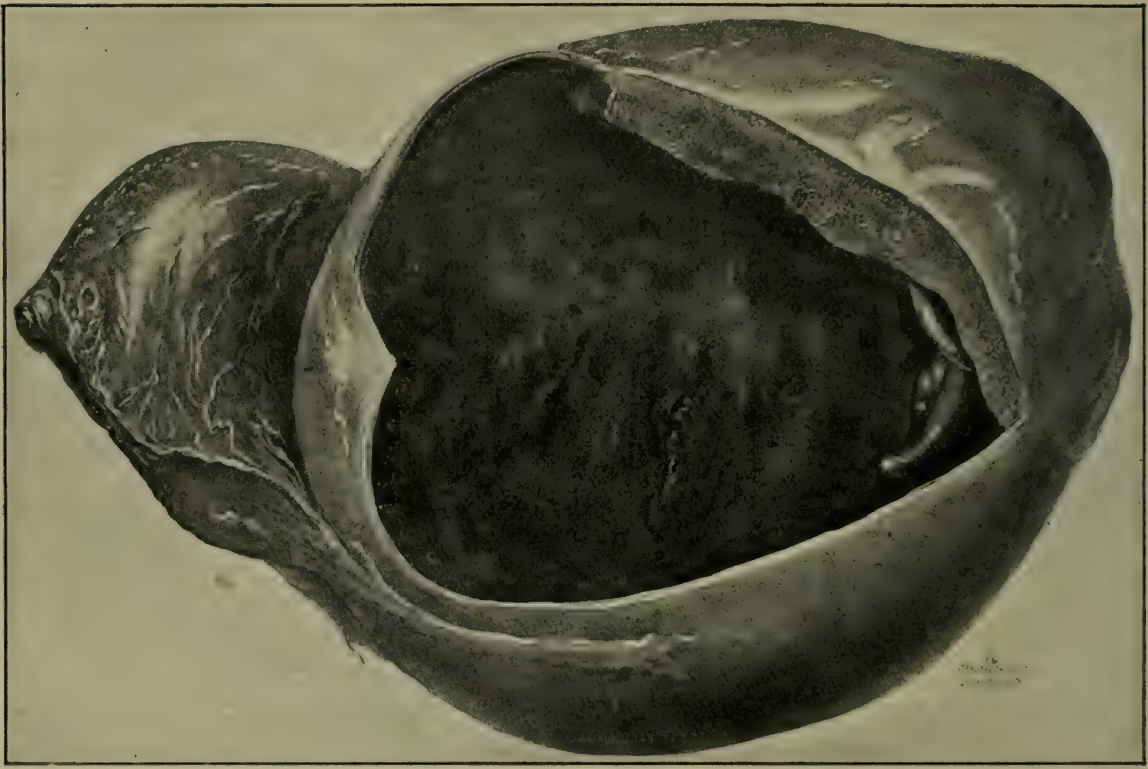


Fig. 5.

Posterior view of uterus and sac, Case II, showing placenta and stump of umbilical cord.

The cord is attached in the region of the upper and outer angle. Accompanying the specimen is a female fœtus in an early stage of maceration, weighing 4 lb. 7 oz. It does not appear to be malformed, and most certainly is not grossly so.

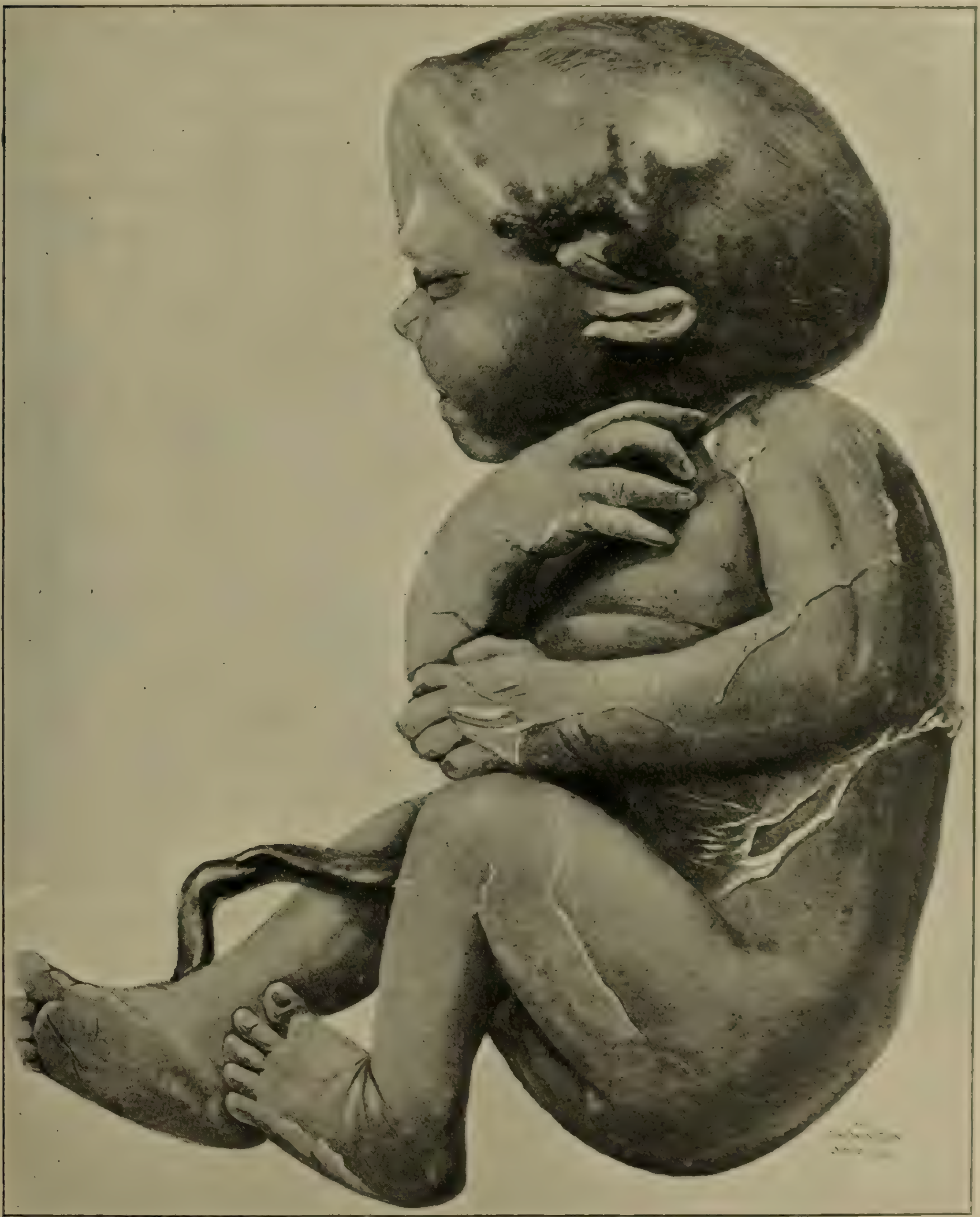


FIG. 6.

Fœtus from Case II showing early maceration.

COMMENTS.

In the first case, except that the separation of adhesions made the work slow, no difficulties and no bleeding were met with. I feel, therefore, *that if it were safe* to leave a dead, full-term, ectopic fœtus in the abdomen for months, this should be done in all cases in which the child is dead at the time when the patient is first seen.

In the second case, the extraordinary vascularity and the inability to avascularize the sac before freeing it, were the main difficulties. The vascularity of the sac in this case was out of all proportion to that of the sac in the first case, and was the real danger of the operation. Not only was the blood lost considerable in amount, but the continuous bleeding made recognition of structures very difficult, and resulted in a division of, or strangulation of the wall of, the right ureter. If I met this case again I should open the sac first in spite of the risk of peritoneal infection, remove the fœtus and then remove as much of the sac as possible with the placenta, marsupializing and draining or packing the remainder of the sac.

DISCUSSION.

With a view to formulating a line of treatment, I have collected 100 cases from the literature of the subject, dealing almost exclusively with cases after the thirty-fourth week of gestation. On tabulating these abstracts interesting points are brought out: (1) With regard to the symptoms during pregnancy, (2) with regard to the symptoms of labour, (3) with regard to the complications consequent on labour or fœtal death, and (4) with regard to the findings at operation.

Among the 100 cases collected—in 77 per cent. pregnancy went to term, in 16 per cent. it was continued to between the thirty-fourth and thirty-sixth week, in 2 per cent. it was continued to between the twenty-eight and thirtieth week, while in 5 per cent. the history suggested that the pregnancy had progressed two to four weeks over term.

The site of the pregnancy was thought to be: Primary abdominal, 3 per cent.; secondary abdominal, 37 per cent.; secondary broad ligament, 24 per cent.; primary ovarian, 4 per cent.; rudimentary uterine horn, 7 per cent. In the remaining 25 per cent. it was undetermined.

I cannot in any way vouch for the correctness of these figures, as it is obvious that in many cases it will be extremely difficult to be certain of the site of the pregnancy.

Pregnancy.—The pregnancy was normal in all respects in 33 per cent. of the cases, this being a characteristic feature of rudimentary horn pregnancies. Among seven of these latter, pregnancy was absolutely normal in four, while in two others it was complicated by severe vomiting in one and cystitis at the thirty-sixth week in the other. There was a history of a more or less acute abdominal catastrophe occurring between the sixth and sixteenth week in 50 per cent. of the cases. This undoubtedly synchronized with the giving way of the sac as the result of erosion, stretching or hæmorrhage, probably in the majority of cases the former. The attack was in a large proportion of these cases typical of the attack associated in one's mind with a ruptured tubal gestation. In 39 per cent. there were other symptoms atypical of normal pregnancy. Pain was the most constant, sometimes occurring in attacks, sometimes complained of as a continuous gnawing or aching sensation. Irregular bleeding was also of frequent occurrence, being rarely, however, severe. Vomiting, intestinal distension, constipation and urinary troubles were not infrequent. The movements of the child were violent and painful in a considerable proportion of the cases; in 3 per cent., however, fœtal movements were never felt. There was evidence of toxæmia of pregnancy in 4 per cent. of the cases, albuminuria in two cases, one commencing after the death of the fœtus, pernicious vomiting in one case and eclampsia, occurring during labour, in one case. The uterine decidua was expelled during the early weeks of pregnancy in 3 per cent. of the cases. Extra-uterine pregnancy was associated with an intra-uterine pregnancy in 3 per cent. of the series.

Labour.—A recognizable labour, consisting of intermittent pains, with or without show, and frequently with dilatation of the os uteri, occurred in 61 per cent. of the cases. In three of the cases a gush of water occurred; this was possibly urine, it not being an infrequent occurrence in the later weeks of normal pregnancy for a mother to have a similar flow, which she attributes to the rupture of the membranes, yet on examination these are found to be intact. In many cases contractions of the uterus synchronized with the pains, and in others contractions of the sac were felt, these being cases of rudimentary horn pregnancy. The uterine decidua was expelled during false labour in 8 per cent. of the cases only. This is of interest as correcting a fairly constant text-book description, a parallel of the shedding of vesicles during pregnancy with vesicular moles, which rarely, if ever, occurs. Death of the fœtus during, or shortly after labour, or at, or shortly after full time in those cases in which labour did not supervene, occurred in 60 per cent. of the cases, and in none did the life of the fœtus postdate the labour by more than ten days.

Complications following on Labour or Death of the Fœtus.—This must be regarded as of extreme importance as bearing on the treatment of the cases. In 50 per cent. of seventy-four cases in which operation was not performed at or shortly after term, there were no complications; the sac shrank and the patient's condition returned to or approximated to and remained at the normal as in the first case described by the author. In 33 per cent. there were symptoms more or less severe of infection of the sac, pyrexia, rigors, pain, emaciation, vomiting, signs of general peritonitis, or fistula formation usually in connexion with the pelvic colon or rectum, the latter condition arising in 33 per cent. of the septic cases, 11 per cent. of the total. The onset of these septic symptoms occurred as early as ten days and as late as fifteen years after labour or death of the fœtus. Bleeding, more or less severe, was a sequel of 12 per cent. of the cases; rupture of the sac, with peritonitis, of 2·3 per cent. of the series.

Treatment.—The ideal treatment would naturally be based upon an analysis of the results of the preceding series. The results of analysis of the tables may be grouped in two headings: (1) The time at which the operation was performed, with the results to the mother and, if living, to the child; (2) the method of dealing with the sac and placenta with the results to the mother.

(1) (*a*) Operation at term, child alive, twenty-two cases. *Maternal results:* Recovery, 73 per cent.; death, 27 per cent. *Fœtal results:* Fœtus well-developed, 54·5 per cent.; fœtus mal-developed, 45·5 per cent.; children died shortly after delivery, 18 per cent. The maternal deaths in this series were six. One of these deaths was due to delirium, existing both before and after labour, possibly toxæmic in origin; in the remainder, death was due to sepsis, but in two of these the operation was performed before the year 1880. The fœtal deformities consisted of: Cranial asymmetry, six cases, which usually righted itself; talipes, five cases, which responded satisfactorily to surgical treatment; torticollis, four cases; umbilical hernia and congenital dislocation of the hip, one case each. These latter also responded to treatment. Many of the children had several of these deformities.

(*b*) Operation within eight weeks of labour or death of the fœtus, thirty cases. *Maternal results :* Recovery, 80 per cent. ; death, 20 per cent. The maternal deaths in these series were five ; they were due : to pre-operative hæmorrhage from rupture of the sac, one case ; to shock from rupture of the sac, one case ; to hæmorrhage, two cases ; to sepsis and secondary hæmorrhage, one case.

(*c*) Operation after the eighth week following labour or death of the fœtus, forty-six cases. *Maternal results :* Recovery, 95·75 per cent. ; death, 4·25 per cent. The maternal deaths in these series were two. There were due to sepsis and secondary hæmorrhage, one case ; to sepsis only, one case.

(2) *The Method of Dealing with the Sac and Placenta.*—Four methods have been adopted : (*a*) The whole sac, including the placenta, has been removed ; (*b*) the placenta has been removed and the sac marsupialized and packed with gauze, or drained ; (*c*) the placenta has been left *in situ* and the sac marsupialized and packed with gauze, or drained ; (*d*) the sac has been sewn up over the placenta and the abdomen closed.

(*a*) *Forty-five cases.* The results to the mothers have been as follows: Recoveries, 91 per cent. ; deaths, 9 per cent. The deaths were four in number. They were due to pre-operative hæmorrhage and shock, one case ; to shock from rupture of the sac, one case ; to hæmorrhage, one case ; to sepsis, one case. The death from hæmorrhage occurred in a case operated on six weeks after labour.

(*b*) *Twenty-three cases.* The results to the mothers have been as follows : Recoveries, 87·5 per cent. ; deaths, 12·5 per cent. The deaths were three in number. They were due to pre- and post-operative delirium (? toxæmic) in one case, to hæmorrhage in one case, to septicæmia in one case. The death from hæmorrhage occurred in a case operated on fourteen days after labour.

(*c*) *Twenty-six cases.* The results to the mothers have been as follows : Recoveries, 76 per cent. ; deaths, 24 per cent. The deaths were six in number. They were due to general peritonitis, one case ; to sepsis and secondary hæmorrhage, two cases ; to sepsis only, three cases. In the case of general peritonitis, the condition was present before operation.

(*d*) *Three cases.* The results to the mothers have been as follows : Recovery, 100 per cent. In one of these cases the sac had been drained later by posterior colpotomy.

The Ideal Treatment.—That the child is worth saving is certainly beyond doubt, as shown by a perusal of the first table. This statement must be qualified by "if the life of the mother is not endangered thereby." The above figures show a maternal mortality of 27 per cent. in twenty-two cases in the series where the child is alive. Of these six deaths, three must be excluded, the delirium case and the two cases operated on prior to 1880; this gives a corrected mortality of 16 per cent. in nineteen cases, which is less than the mortality of those cases operated on in the first eight weeks after labour or fœtal death. It is considerably greater than the mortality in those cases operated on after the eighth week, but there is little doubt that many cases in this latter group died of septic complications without being operated on, while many others had their health permanently ruined by prolonged sepsis and recovered with a fæcal fistula. It can, therefore, be said with regard to the time of operation, that cases of extra-uterine gestation at or near term, should be operated on during the life of the child whenever possible, and in view of the great risk of septic infection of the sac, operation should not be delayed even after the death of the fœtus; delay only resulting in increasing the risk of sepsis and not ensuring anæmia of the placental site, as in Fairbairn's case, in which there was profuse hæmorrhage six weeks after fœtal death. With regard to the type of operation, removal of the sac is undoubtedly the ideal treatment whenever possible. In those cases where removal of the sac is impossible, marsupialization of the sac, with removal of the placenta and drainage of the sac or plugging of the sac with gauze, should be carried out when possible. In those cases where attempts to remove the placenta cause profuse hæmorrhage, the sac should be marsupialized, packed with gauze, and the placenta allowed to come away piecemeal.

Abstract of 100 Cases of Extra-uterine Pregnancy advancing to the Thirty-fourth Week or Term, with Results.

Bibliography	Duration of pregnancy	Character of pregnancy	Labour	Complications following labour	Date of operation	Findings at operation; treatment of sac; site of pregnancy	Result
ANDREWS, H. R., *Trans. Obst. Soc. Lond.* (1907), 1908, xlix, p. 209	Thirty-five weeks	Severe vomiting throughout	Thirty-fifth week; decidua shed; death of fœtus followed	Pyrexia starting five months after labour; offensive diarrhœa	Five months after labour	Suppuration in sac; fœtus and placenta removed; sac and uterus removed; drainage; right rudimentary horn pregnancy	Recovery
Idem.; ibid. ...	Thirty-five weeks	Normal	Rupture of sac at thirty-fifth week	—	Thirty-fifth week	Rupture of sac with placenta projecting through tear; hæmoperitoneum; removal of sac; right rudimentary horn pregnancy	Death from shock and hæmorrhage
OLIVER, J., *Liverpool Med. and Chir. Journ.*, 1890, x, p. 317	Term	Pain and bleeding from sixth to tenth week; irregular bleeding throughout pregnancy	None; fœtus not felt after term	—	Four months after term	Many adhesions; sac removed; pedicle formed by outer left broad ligament; primary ovarian pregnancy	Recovery
TAFT, C. E., *Med. Rec.*, New York, 1888, xxxiii, p. 209	Term	Normal	None; death of fœtus about term	Pyrexia and emaciation due to septic absorption started six months after term; irregular bleeding after term	Nine months after death of fœtus	Sac incised; pus escaped; fœtus removed, placenta left *in situ*; sac marsupialized; drained; placenta removed tenth day; right rudimentary horn pregnancy	Recovery
ASPELL, J., *Amer. Journ. Obst.*, New York, 1906, liv, p. 39	Term	Severe pain at sixteenth week; irregular bleeding with pain and nausea throughout	None; death of fœtus at term	—	Two weeks after death of fœtus	Sac incised; fœtus removed; placenta situated superiorly and anteriorly; removed; sac marsupialized and packed with gauze; left broad ligament pregnancy	Recovery
MCCANN, F. J., *Proc. Roy. Soc. Med.*, 1916, ix (Sect. Obst.), p. 103	Term	Normal	At term "waters" came away; decidua not shed; death of fœtus followed	Pain, vomiting, and abdominal distension followed labour	Nine days after labour	Fœtus free among intestines; placenta attached to right side of posterior wall of uterus; subtotal hysterectomy; primary abdominal pregnancy	Recovery

Bibliography	Duration of pregnancy	Character of pregnancy	Labour	Complications following labour	Date of operation	Findings at operation ; treatment of sac ; site of pregnancy	Result
Bland-Sutton, J., *Trans. Obst. Soc. Lond.* (1898), 1899, xl, p. 308	Term or post-mature	Normal	At term or post-mature ; decidua not shed	—	During labour	Fœtus free among intestines ; removed ; placenta attached to back of left broad ligament ; removal of placental site with isthmus of tube ; left secondary abdominal pregnancy	Recovery ; child well formed ; died two hours after delivery; convulsions
Tate, W., *Journ. of Obst. and Gyn. Brit. Emp.*, 1908, xiii, p. 176	Term	Severe pain at sixth and eleventh week; incontinence of urine after eighteenth week ; severe pain after thirtieth week	At term ; indefinite pain; decidua not shed ; death of fœtus followed	Clots were passed and offensive discharge for one week after date of labour	Nine weeks after term	Many adhesions ; sac incised ; fœtus removed ; placenta attached to left tube and left broad ligament ; removed ; sac marsupialized and drained ; left secondary abdominal pregnancy	Recovery
Ayers, E. A., *Med. News*, New York, 1897, lxx, p. 493	Thirty-five weeks	Irregular bleeding and pain from eighth to sixteenth week; pain and emaciation throughout pregnancy	—	—	At thirty-fifth week	Child free among intestines ; removed ; placenta attached to left Fallopian tube ; removed with tube ; left secondary abdominal pregnancy	Death from shock
Yardley, T. H., *Amer. Journ. Med. Sci.*, 1846, xi, p. 348	Term	Normal	At term ; decidua not shed	Passed through normal pregnancy four years later ; labour obstructed by extra-uterine fœtus ; child still-born ; pyrexia, followed by discharge of pus and fœtal bones per rectum fifteen years later	During fifteenth year after labour	Bones removed per rectum at several sittings extending over months ; sac washed out per rectum after each operation	Recovery
Swift, J. B., *Boston Med. and Surg. Journ.*, 1898, cxxxviii, p. 441	Term	Severe pain at sixth week ; dyspepsia and constipation throughout	At term ; gush of water ; decidua not shed ; death of fœtus followed	—	Six weeks after labour	Sac incised ; fœtus removed ; placenta attached to left tube and left broad ligament ; removed with site ; secondary abdominal pregnancy	Recovery
Rector, J. M., *New York Med. Journ.*, 1894, lx, p. 648	Term or post-mature	Normal	No labour ; death of fœtus at term or post-mature	—	Six weeks after death of fœtus	Sac incised, fœtus removed ; placenta postero-superior ; sac removed ; rudimentary uterine horn pregnancy	Death from shock and loss of blood

Warren, J. C., *Boston Med. and Surg. Journ.*, 1892, cxxvii, p. 525	Thirty-six weeks	Normal	None; slight loss at thirty-sixth week, followed by death of fœtus	—	Sixteen weeks after death of fœtus	Sac incised; fœtus removed; placenta removed; sac marsupialized and drained; secondary broad ligament pregnancy	Recovery
Leith-Napier, A. D., *Brit. Gyn. Journ.*, Lond., 1891-2, vii, p. 362	Thirty-six weeks	Normal	At thirty-sixth week clot passed; ?decidua; death of fœtus later	Abdominal pain; diarrhœa with offensive stools, followed four months later with pyrexia and vomiting	Four and a half months after labour	Many adhesions; sac incised; pus and gas escaped; fœtus removed; placenta removed; sac marsupialized and drained; secondary broad ligament pregnancy	Recovery fæcal fistula formed and healed
Bovée, J. W., *Amer. Journ. of Obst.*, New York, 1897, xxxvi, p. 314	Term	Severe abdominal pain at fourth week and throughout pregnancy	Term; decidua shed; fœtal death at term	—	Ten weeks after labour	Many adhesions; sac incised; fœtus removed; placenta attached to left pelvic wall; sac and placenta removed; left posterior broad ligament pregnancy	Death from sepsis on thirtieth day
Wilson, H. P. C., *Amer. Journ. of Obst.*, 1880, xiii, p. 821	Intra-uterine thirty-six weeks, extra uterine term	Normal	Labour at term; child delivered normally by vagina at thirty-sixth week	—	Term	Sac incised, child removed; sac marsupialized and drained; placenta triple situated in left iliac fossa and left half of pelvis	Death from septicæmia; child not deformed; did well
Sale, E. P., *New Orleans Med. and Surg. Journ.*, October, 1870	Term	Normal	—	—	Term	Sac incised, child removed; placenta removed; uterine pregnancy discovered; Cæsarean section	Death from septicæmia; children not deformed; did well
Jessop, T. R., *Obst. Journ. Great Brit. and Irel.*, December, 1876	Term	Pain and bleeding throughout pregnancy	—	—	Term	Child free among intestines; removed; placenta covered pelvic brim; drainage	Recovery; child not deformed; did well
Smyly, W. J., *Brit. Gyn. Journ.*, 1895-6, xi, p. 495	Term	Severe abdominal pain and distension at eighth week	None	—	Four months after term	Many adhesions; sac incised; fœtus removed; hysterectomy with removal of sac	Recovery
Andrews, H. R., *Trans. Obst. Soc. Lond.* (1903), 1904, xlv, p. 461	Term	Severe pain throughout pregnancy	Term; show; decidua not shed; death of fœtus followed	Eight years later became pregnant in the left tube and ruptured at three months; indication for operation was vomiting	Eight years after labour	Lithopædion free in abdominal cavity; many adhesions to fœtus; fœtus removed; right secondary abdominal pregnancy; left, recent three months ruptured tubal pregnancy	Recovery

Bibliography	Duration of pregnancy	Character of pregnancy	Labour	Complications following labour	Date of operation	Findings at operation ; treatment of sac ; site of pregnancy	Result
Hart, Berry D., *Journ. of Obst. and Gyn. Brit. Emp.*, 1902, i, p. 129	Thirty-six weeks	Normal	—	Flooding four months after date of term ; followed by decrease in swelling and good health	Five years after term	Sac incised ; fœtal bones removed ; sac marsupialized ; packed with gauze ; left broad ligament pregnancy	Recovery with sinus
Earle, F. B., *Amer. Journ. Obst.*, New York, 1903, xlvii, p. 372	Term	Acute attacks of abdominal pain at sixth, twelfth and twenty-third week; whole pregnancy disturbed by nausea and vomiting	At term ; decidua not shed ; death of fœtus followed	Septic infection, slight symptoms	Seven weeks after labour	Fœtus and placenta removed	Recovery
Idem ; ibid.	Term	Normal ; cystitis at thirty-sixth week	At term ; decidua not shed ; death of fœtus followed	—	Fourteen days after labour	Sac incised ; fœtus and placenta removed ; rudimentary uterine horn pregnancy	Death sixty-six hours after operation from shock
Black, A. L., and **Read, H.**, *Journ. Amer. Med. Assoc.*, Chicago, 1908, i, p. 2137	Thirty-six weeks	Pain and slight bleeding at sixth week	At thirty-sixth week ; decidua not shed	—	Six days after labour	Sac incised, child removed ; placenta attached to inferior surface of mesentery ; sac marsupialized and packed with gauze ; placenta removed eight weeks later	Recovery ; baby well formed ; did well
Guinard, E., *Med. Press and Circ.*, Lond., 1904, n.s., lxxxii, p. 255	Thirty-six weeks	Symptoms of intraperitoneal hæmorrhage at eleventh week ; toxæmia of pregnancy (albuminuria) at thirty-fourth week	At thirty-sixth week ; decidua not shed ; death of fœtus followed	Infection of sac ; septic absorption	Four weeks after labour	Posterior colpotomy ; pus evacuated ; laparotomy ; removal of fœtus and placenta ; sac packed with gauze and drained ; secondary abdominal pregnancy	Recovery with sinus
Read, C. A. L., *Trans. Amer. Assoc. Obst. and Gyn.*, New York, 1905, xviii, p. 239	Term	Acute abdominal pain at eighteenth week	None	Recurrent uterine hæmorrhage and pyrexia after term	Thirty weeks after term	Sac incised ; fœtus removed ; sac marsupialized and packed with gauze ; placenta separated in four weeks	Recovery

Idem; ibid. ...	Term	No fœtal movements felt in last three months of pregnancy	None	Pyrexia and septic absorption after apparent term	Eight weeks after probable term	Sac incised; fœtus removed; sac marsupialized and drained, also posterior colpotomy and drainage: placenta separated by fourth week; right posterior broad ligament pregnancy	Recovery
Idem; ibid. ...	Term	Attack of left pelvic pain at fourth week	At term; decidua not shed; death of fœtus followed	Pyrexia and septic absorption started three and a half years after labour	Four years after labour	Sac incised; fœtal remnants removed; sac packed with gauze; fæcal fistula to pelvic colon followed	Recovery with fæcal fistula
Edgar, J., *Glas. Med. Journ.*, 1905, lxiv, p. 445	Term	Frequent severe attacks of pain from eighth to twelfth week	At term; decidua not shed; death of fœtus followed	Septic absorption; perforation of sac to bowel	One month after labour	Infection of sac and fœtus due to perforation to bowel; sac not defined; placenta removed; sac packed with gauze	Recovery with fæcal fistula
Vinberg, H. M., *Trans. New York Obst. Soc.; Amer. Journ. Obst.*, October, 1917	Term	Toxæmic albuminuria	—	—	At term	Sac incised; child removed; profuse bleeding; removal of uterus and sac; uterine fibroids	Recovery; baby had talipes calcaneus; did well
Oliver, J., *Edin. Med. Journ.*, 1898, iv, p. 154	Term	Bleeding at eighth and twenty-seventh week; acute abdominal pain at eleventh week; discharge of liquor amnii per vaginam at thirty-sixth week	None	—	Fourteen weeks after term	Sac incised; fœtus removed; placenta anterior between uterus and pubes; sac marsupialized and drained; placenta separated slowly; right broad ligament pregnancy	Recovery
Idem; ibid. ...	Term	Normal	None; death of fœtus at term	Pyrexia; no symptoms	Seven weeks after term	Extra-peritoneal operation; sac incised; contained six pints of pus; fœtus removed; placenta in right iliac fossa; sac marsupialized and packed; placenta separated slowly; right broad ligament pregnancy	Recovery
Idem; ibid. ...	Term	Bleeding and pain sixth to fourteenth week	None; death of fœtus at term	—	Five months after term	Sac incised; fœtus removed; sac marsupialized and drained; placenta separated slowly; left broad ligament pregnancy	Recovery
Idem; ibid. ...	Term	Bleeding and slight pain with expulsion of decidua at sixteenth week	No labour; bleeding at term and death of fœtus	—	Nine months after term	Sac removed with fœtus and placenta; sac intact; right ovarian pregnancy	Recovery

Bibliography	Duration of pregnancy	Character of pregnancy	Labour	Complications following labour	Date of operation	Findings at operation; treatment of sac; site of pregnancy	Result
CRAGIN, E. B., *Amer. Journ. Obst.*, New York, 1914, lxx, p. 1019	Term	Normal	At term; decidua not shed	—	At term	Sac incised; child removed; sac removed with left tube; drainage per vaginam later; left secondary abdominal pregnancy	Recovery; baby cranial and facial asymmetry; bilateral talipes; did well
Idem, 1900, xli, p. 740	Term	Slight bleeding at twelfth week; curetted	At term; decidua not shed; death of fœtus next day	Toxæmia; albuminuria	Ten days after labour	Sac incised; fœtus removed, not deformed; sac and uterus removed; secondary abdominal pregnancy	Recovery
Idem; ibid. ...	Term	Severe pain and bleeding tenth to fourteenth week	—	—	At term	Sac incised; child removed; placenta in floor of sac; sac marsupialized and packed with gauze; placenta separated in four weeks; right broad ligament; pregnancy	Recovery; baby left congenital hip; asymmetry of skull; umbilical hernia; did well
Idem; ibid. ...	Post-mature	Bleeding seventh week; curetted; pain and bleeding seventeenth week	At forty-sixth week; decidua not shed; death of fœtus followed	—	Ten weeks after labour	Sac incised; fœtus removed; placenta removed; sac marsupialized and packed with gauze; right broad ligament pregnancy	Recovery with sinus
SMITH, A., *Brit. Med. Journ.*, Lond., 1901, ii, p. 961	Term	Normal	At term; decidua not shed; death of fœtus followed	—	Fourteen weeks after labour	Sac incised; fœtus removed; sac removed; placenta at site of left ovario-pelvic ligament; secondary abdominal pregnancy	Recovery
SCOTT, N. S., *Cleveland Med. Journ.*, 1911, x, p. 514	Term	Pain in early months	At term; decidua not shed; death of fœtus ten days later	Abdominal distension, emaciation; fistula to bowel; discharge of fœtal bones per rectum	Death eighteen years later	*Autopsy.*—Pelvic fibrous and purulent peritonitis; sac contained fœtid pus and fragments; no bones; perforation of sac to rectum	—
LAPKIN, H. M., *Amer. Journ. Obst.*, New York, 1900, xli, p. 289	Term	Severe abdominal pain and bleeding tenth and thirteenth week; continuous severe pain throughout pregnancy	—	—	Thirty-ninth week of pregnancy	Child free among intestines; placenta on posterior surface of left broad ligament and in left tube; placenta and site removed; left secondary abdominal pregnancy	Recovery; child lived four hours; facial distortion; cranial asymmetry; bilateral talipes and manus valgus right hand

Grimsdale, T. B., *Journ. of Obst. and Gyn. Brit. Emp.*, 1912, xxiii, p. 115	Term	Normal; no history; pregnancy synchronous with a uterine gestation	No labour	—	Three years after term	Sac removed unopened; fœtus and placenta in sac; left ovarian pregnancy	Recovery
Tate, W., *Proc. Roy. Soc. Med.*, Lond., 1911-12, v (Obst. Sect.), p. 124	Term	Severe abdominal pain and bleeding at tenth week; pain throughout pregnancy	At term; decidua not shed; death of fœtus followed	—	Four weeks after labour	Fœtus free among intestines; removed; placenta attached in right tube and to back of right broad ligament; removed with site; right secondary abdominal pregnancy	Recovery
Dunning, L. H., *Amer. Journ. Obst.* New York, 1899, xl, p. 592	Thirty-four weeks	Pain and bleeding at tenth week; curetted	At thirty-fourth week; decidua not shed; death of fœtus followed	Bilateral phlegmasia alba dolens; septic absorption	Five weeks after labour	Sac incised; fœtus removed; sac removed piecemeal: secondary abdominal pregnancy	Recovery
Cousins, J. W., *Brit. Med. Journ.*, Lond., 1903, ii, p. 181	Thirty-five weeks	Pain and sickness throughout pregnancy	Thirty-fifth week; decidua not shed; death of fœtus followed	Pyrexia; septic absorption	Eleven weeks after labour	Sac incised: fœtus removed; placenta removed; sac packed with gauze	Recovery
Idem; ibid. ...	Term	Pain and bleeding in early months; pain in later months	—	—	At term	Sac incised; fœtus removed; sac marsupialized and packed with gauze; placenta completely separated in three months	Recovery
Davis, A. B., *Bull. Lying-in Hosp.*, New York, 1917, xi, p. 83	Term	Normal	No labour; death of fœtus at term	Septic infection of sac; streptococcus and gas bacillus	Ten days after death of fœtus	Sac incised; gas and foul fluid evacuated: sac marsupialized and packed with gauze; placenta separated by thirty-sixth day; right secondary abdominal pregnancy	Recovery
Nutt, G. D., *Amer. Journ. Obst.*, New York, 1910, lxi, p. 906	Term	Flooding first four weeks; child never felt	At term; decidua not shed	—	Two and a half years after labour	Sac incised; fœtus removed; sac and uterus removed; left broad ligament pregnancy	Recovery
Idem; ibid. ...	Term	Normal	At term; decidua not shed	Pain and bleeding	Eleven weeks after labour	Sac incised: fœtus removed; hysterectomy with upper part of sac; lower part of sac marsupialized and packed with gauze; right broad ligament pregnancy	Recovery

Bibliography	Duration of pregnancy	Character of pregnancy	Labour	Complications following labour	Date of operation	Findings at operation ; treatment of sac ; site of pregnancy	Result
Marsh, J., *Journ. Obst. and Gyn. Brit. Emp.*, 1906, ix, p. 438	Term	Normal	At term ; decidua not shed ; death of fœtus followed	Two and a half years after labour, pain, diarrhœa, and pyrexia ; fœtus, headless, discharged per rectum six months later	Three years after labour	Head removed from sac *per rectum* ; sac behind uterus	Recovery
Noble, C., *Amer. Gyn.*, ii, No. 1, p. 165	Thirty-four to thirty-six weeks	Severe abdominal pain at sixth week ; pain and bleeding thirty-fourth to thirty-sixth week	No labour ; death of fœtus at thirty-sixth week	Pyrexia and rigors followed two years later	Two years and three months after death of fœtus	Sac removed unruptured ; fœtus well preserved ; left secondary abdominal pregnancy	Recovery
Cragin, E. R., *Amer. Journ. Obst.*, New York, 1901, xliii, p. 96	Term	Bleeding fourth week ; severe pain at eighth and thirty-eighth week	At term	—	At term	Sac found ruptured ; sac incised ; child removed ; uterus, sac and placenta removed ; left broad ligament pregnancy	Recovery ; child not malformed ; did well
MacLean, M., *Amer. Journ. Obst.*, New York, 1890, xxiii, p. 348	Term	Severe pain fourteenth week and afterwards ; emaciation	At term ; decidua not shed ; death of fœtus followed	—	Three months after labour	Sac incised ; fœtus removed ; placenta, anterior, removed ; sac marsupialized and drained ; right secondary abdominal pregnancy	Recovery
Ross, J., *Amer. Journ. Obst.*, New York, 1909, lix, p. 602	Term	Severe pain and bleeding twelfth to twentieth week	At term ; decidua not shed ; child died some days later	—	Six days after death of fœtus	Sac incised ; fœtus removed ; placenta removed ; free loss, vessels on site ligatured ; placenta on back of right broad ligament ; right secondary abdominal pregnancy	Recovery
Jardine, R., *Glas. Med. Journ.*, 1916, lxxxvi, p. 137	Term	Severe pain and bleeding at ninth week	At term ; decidua shed ; death of fœtus followed	—	Four weeks after labour	Sac incised ; fœtus removed ; placenta removed ; part of sac removed ; rest marsupialized and packed with gauze ; right secondary abdominal pregnancy	Recovery
Kirschner, W., *Trans. Amer. Assoc. Obst. and Gyn.*, 1910, xxii, p. 189	Term	Severe pain and bleeding at eighth week ; pain from eighth to sixteenth week	At term ; decidua not shed	—	Twelve days after labour	Sac incised ; child removed ; sac removed ; right ovarian pregnancy	Recovery ; child no maldevelopments ; did well

Savage, T. C., *Proc. Roy. Soc. Med.*, 1911-12, v (Sect. Obst.), p. 72	Term	Severe pain and bleeding from twelfth week to fifteenth week	At term; decidua not shed	—	During false labour	Sac incised; child removed; placenta, anterior, removed; sac marsupialized and plugged; right secondary abdominal pregnancy	Recovery; child slight torticollis and right talipes equino-varus; did well
Reynolds, E., *Boston Med. and Surg. Journ.*, 1911, clxiv, p. 681	Term	Severe pain and bleeding in early weeks; curetted; pain throughout	None; fœtus died at term	—	Two weeks after term	Sac incised; fœtus removed; placenta found separated by large retro-placental hæmatoma; removed; sac packed with gauze; secondary abdominal pregnancy	Recovery
Idem; ibid. ...	Term	Irregular pain and bleeding throughout	None; date of fœtal death uncertain	—	At term	Intraperitoneal hæmorrhage; sac incised; fœtus removed; placenta in right side of pelvis; sac packed with gauze; placenta completely separated by forty-fourth day; secondary abdominal pregnancy	Recovery
Lane, J., *Boston Med. and Surg. Journal*, 1911, clxiv, p. 683	Term	Bleeding and hyperemesis sixth to eighteenth week; pain throughout after sixteenth week	At term; decidua not shed	—	During false labour	Sac incised; child removed; placenta situated in front of left kidney; removed; sac packed with gauze; uterus tubes and ovaries normal; primary abdominal pregnancy	Recovery after transfusion of blood; child not malformed; died in twenty-four hours
Eagleson, J., *Journ. Amer. Med. Assoc.* Chicago, 1896, xxvi, p. 369	Term	Severe pain and bleeding with expulsion of decidua at eleventh week; pain fourteenth week	At term; albuminuria and eclampsia; death of fœtus at term	—	During false labour	Sac ruptured; placenta antero-superior: fœtus removed; sac and placenta removed; right secondary abdominal pregnancy	Recovery
Fenger, C., *Journ. Amer. Med. Assoc.*, Chicago, 1891, xvi, p. 879	Term	Severe pain and vomiting at eighth week; pain at intervals throughout	At term; decidua not shed; death of fœtus followed	Pyrexia, pain and vomiting six weeks after labour; perforation of sac to bowel eighth week	Nine weeks after labour	Sac incised; gas and fæces escaped; fœtus removed; placenta in pelvic and right iliac fossa; sac marsupialized and packed with gauze; secondary abdominal pregnancy	Death from sepsis and hæmorrhage eighth day; fistula to transverse colon
Tait, Lawson, *Trans. Obst. Soc. Lond.* (1892), 1893, xxxiv, p. 192	Term	Severe pain, vomiting and distension eleventh to fourteenth week; severe pain twenty-fourth week	None; death of fœtus at term	Show daily after death of fœtus	Five months after death of fœtus	Fœtus in shrunken amnion; free in abdomen; placenta in right Fallopian tube; removal of fœtus, placenta, tube, and sac; right secondary abdominal pregnancy	Recovery

Bibliography	Duration of pregnancy	Character of pregnancy	Labour	Complications following labour	Date of operation	Findings at operation; treatment of sac; site of pregnancy	Result
Taylor, J. W., *Trans. Obst. Soc. Lond.* (1891) 1892, xxxiii, p. 115	Term	Pain and bleeding sixth to eighth week	At term; decidua not shed	—	Four days after labour	Child free in abdominal cavity; removed; placenta in right side of pelvis; sac drained; twelve days later septic infection; placenta removed; sac plugged; right secondary abdominal pregnancy	Recovery; child cranial asymmetry; torticollis; right pes calcaneo-valgus and deformity of right knee; did well
Phillips, J., *Trans. Obst. Soc. Lond.* (1899), 1900, xlii, p. 121	Term	Severe pain and bleeding fourth to sixth week; pain and difficulty with micturition from fourteenth week to term	At term; decidua not shed; death of fœtus followed	Severe pain for three months after labour; pyrexia abdominal pain, distension and vomiting twenty-one weeks after labour with passage of blood per rectum	Twenty-one weeks after labour	Peritonitis; sac incised; foul pus escaped; fœtus removed; placenta, superior and to left; removed; sac drained; primary abdominal pregnancy	Recovery
Herman, G. E., *Trans. Obst. Soc. Lond.*, 1898, xxxix. p. 135	Term	Pain throughout pregnancy	None; abdomen decreased after term	—	Three months after term	Sac incised; fœtus removed; placenta attached to fundus uteri; removed with fundus uteri; right secondary abdominal pregnancy	Recovery
Taylor, J. W., *Trans. Obst. Soc. Lond.*, (1897), 1898, xxxix, p. 178	Term	Normal	At term; decidua not shed; death of fœtus followed	Bleeding started five weeks after labour; decidua shed seven weeks after labour	Three months after labour	Sac incised; fœtus removed; placenta pelvic; sac and placenta removed; pedicle formed by right broad ligament; right secondary abdominal pregnancy	Recovery
Cullingworth, C. J., *Trans. Obst. Soc. Lond.* (1893), 1894, xxxv, p. 155	Thirty-six weeks	Severe pain and bleeding third week; pain and irregular bleeding throughout pregnancy	None; death of fœtus at thirty-sixth week	—	One month after death of fœtus	Sac incised; fœtus removed; placenta, antero-superior, removed; sac marsupialized and drained; right broad ligament pregnancy	Recovery
Idem; ibid. (1888), 1889, xxx, p. 480	Term	Severe pain and vomiting sixteenth week	Decidua not shed; death of fœtus followed	—	Eight months after labour	Sac incised; fœtus removed; placenta, anterior, removed; sac marsupialized and drained; left broad ligament pregnancy	Recovery

Rosenwasser, M., *Amer. Journ. Obst.* New York, 1897, xxxvi, p. 52	Term	Severe pain at ninth week	At term; decidua not shed; death of fœtus followed	Pyrexia and pain on twentieth day after labour	Twenty-two days after labour	Sac incised; fœtus removed; placenta, attached to anterior abdominal wall back of uterus and right broad ligament, removed; both ovarian arteries ligatured; sac marsupialized and plugged	Recovery
Lyle, R. P. R., *Journ. Obst. and Gyn. Brit. Emp.*, 1906, x, p. 596	Term	Bleeding in early weeks; fœtal movements never felt	At term; decidua not shed; date of fœtal death doubtful	—	One week after labour	Sac ruptured; fœtus, free, removed; placenta left *in situ*; abdomen closed; left broad ligament pregnancy	Recovery
Idem; ibid. ...	Thirty-six weeks	Brownish-red discharge throughout	At thirty-sixth week; decidua shed; death of fœtus followed	—	Seven weeks after labour	Sac incised; fœtus removed; sac closed over placenta; abdomen closed; later, posterior colpotomy; drainage; gas and pus evacuated; left broad ligament pregnancy	Recovery
Fairbairn, J. S., *Journ. Obst. and Gyn. Brit. Emp.*, Lond., 1906, x, p. 599	Term or post-mature	Pain throughout	At term or post-mature; decidua not shed; death of fœtus followed	Vomiting; anorexia	Six weeks after labour	Sac incised; fœtus removed; placenta postero-inferior; sac marsupialized and packed with gauze	Death from hæmorrhage and septic absorption
Roberts, C. H., *Journ. Obst. and Gyn. Brit. Emp.*, Lond., 1906, x, p. 604	Term or post-mature	Normal	None; death of fœtus at term or post-mature	Pain started five months after term	Seven months after term	Sac removed, unopened; left rudimentary horn pregnancy	Recovery
Landau, Th., *Berl. klin. Wochenschr.*, 1906, No. 32, p. 1061	Term	Pain; bleeding; vomiting at irregular intervals throughout	—	—	At term	Sac incised; child removed; sac removed; placenta in tube and on back of right broad ligament; right secondary abdominal pregnancy	Recovery; baby torticollis; did well
Rodiger, Herman, *Zentral. f. Gyn.*, No. 31, p. 1906	Term	Normal	At term; decidua shed; death of fœtus followed	—	Fifteen weeks after labour	Sac marsupialized, incised; fœtus removed; sac packed with gauze; placenta removed on twentieth day right broad ligament pregnancy	Recovery
Nicholson, W. R., *Amer. Journ. Obst.*, New York, 1908, lvii, p. 837	Thirty-fifth week	Bleeding in early weeks	Thirty-fifth week; decidua not shed; death of fœtus followed	Pyrexia and irregular bleeding	Nine weeks after labour	Sac incised; fœtus removed; sac removed; placenta in roof; right broad ligament pregnancy	Recovery
Conway, W. P., *Amer. Journ. Obst.*, New York, 1913, lxvii, p. 176	Term	Pain and bleeding sixth to sixteenth week; pain and slight loss throughout pregnancy	None; death of fœtus at term	Pyrexia with rigors and foul vaginal discharge followed death of fœtus	Four weeks after term	Sac removed unruptured; placenta postero-superior; right broad ligament pregnancy	Recovery

Bibliography	Duration of Pregnancy	Character of Pregnancy	Labour	Complications following labour	Date of operation	Findings at operation ; treatment of sac : site of pregnancy	Result
Van Master, J. G. and Cowan, E. R., *Amer. Journ. Obst.* New York, 1904, i, p. 179	Term	Slight loss fifth to thirteenth week ; severe pain seventh, ninth, and thirteenth week	No labour ; death of fœtus at term	—	Four weeks after term	Sac incised ; fœtus removed ; placenta removed ; sac removed ; left broad ligament pregnancy	Recovery after passing swab per rectum
Idem ; ibid. ...	Term	Pain and bleeding at fourth week ; catamenia regular, slight throughout pregnancy	No labour ; death of fœtus at term	Pyrexia, night sweats, emaciation	Three months after term	Sac incised ; fœtus removed : sac removed ; placenta antero-superior ; right broad ligament pregnancy	Recovery
Royster, H. A., *Amer. Journ. Obst.*, New York, 1897, xxxvi, p. 820	Term	Severe pain ninth week ; and pain throughout pregnancy	At term ; delivery of first child per vias naturales ; death of extra uterine fœtus	Fourteen days after labour, pain and abdominal distension with pyrexia	Three weeks after labour	Sac incised ; purulent contents ; fœtus removed ; placenta, antero-superior, removed ; sac drained	Recovery
Devane, J., *Lancet*, Lond., 1916, i, p. 731	Term	Slight pain and irregular bleeding throughout ; fœtal movements never felt	At term ; decidua shed	—	At term or shortly afterwards	Sac incised ; fœtus removed ; placenta, antero-inferior, removed ; sac marsupialized and drained ; secondary abdominal pregnancy	Recovery
Hood, N. L., *Lancet*, Lond., 1913, i, p. 1662	Term	Irregular bleeding from fourth to twentieth week ; severe pain fourteenth, sixteenth, and eighteenth week	At term ; decidua not shed	—	During false labour	Sac incised ; child removed ; placenta attached to back of right broad ligament ; sac marsupialized and drained ; right secondary abdominal pregnancy	Recovery ; baby cranial asymmetry ; did well
Browne, L. E., *Lancet*, Lond., 1899, i, p. 957	Term	Normal till thirty-sixth week, then severe pain till term	At term ; decidua not shed ; death of fœtus followed	—	Four months after labour	Sac incised ; fœtus removed ; placenta removed ; sac marsupialized and packed with gauze	Recovery
Morris, J., *Lancet*, Lond., 1910, i, p. 1469	Term	Slight loss at ninth week	At term ; decidua not shed ; death of fœtus followed	—	Four months after labour	Sac incised ; fœtus removed ; placenta posterior ; sac removed ; right broad ligament pregnancy	Recovery

Greenberg, H., *Journ. Amer. Med. Assoc.*, Chicago, 1910, liv, p. 1517	Term	Pain and irregular bleeding throughout	At term; decidua not shed	—	At term	Sac incised; child removed; placenta removed; sac removed in part; uterine and ovarian arteries ligatured	Recovery; child not malformed; did well
Idem; ibid. ...	Term	Severe attacks of pain with vomiting sixth to twelfth weeks	At term; decidua not shed	Attack of abdominal pain	Three months after labour	Sac incised; fœtus removed; ligation of uterine and ovarian vessels; sac marsupialized; drained; placenta completely separated by fifth week; right broad ligament pregnancy	Recovery
Hare, C. H., *Boston Med. and Surg. Journ.*, 1910, clxiii, p. 873	Term	Severe pain at fourth week, and from thirty-third week to term	At term; decidua not shed; death of fœtus at term	—	Eight weeks after labour	Sac ruptured; fœtus removed; placenta in right pelvis; removed; posterior colpotomy; drainage	Recovery
Norman, F. A., *Amer. Journ. Obst.*, 1918, lxxvii, p. 134	Term	Normal	No labour	Three weeks after term, acute abdominal symptoms developed	Five days after onset of symptoms	General peritonitis; sac, beneath mesentery, ruptured; child removed; placenta in right pelvis; sac marsupialized and packed with gauze; left secondary abdominal pregnancy	Death on thirteenth day; child not malformed; did well
Williams, J., *Trans. Obst. Soc. Lond.* (1887), 1888, xxix, p. 482	Thirty-five weeks	Pain and passage of decidua at sixteenth week	—	—	At thirty-fifth week	Sac incised; child removed; sac marsupialized and drained; placenta completely separated by twentieth day	Recovery; child deformed; did well
Rafferty, T. N. and H. N., *Med. Rec.*, New York, 1901, lx, p. 473	Term	Severe pain and collapse ninth week; slight loss thirteenth week; pain, vomiting, and constipation throughout pregnancy	—	—	At term	Child, free among intestines; removed; placenta, attached to right tube and broad ligament; lower abdomen packed with gauze; right secondary abdominal pregnancy	Died; sepsis sixth day; child not malformed, lived thirteen hours
Handfield-Jones, M., *Lancet*, Lond., 1895, ii, p. 972	Thirty-six weeks	Slight bleeding fourteenth to eighteenth week; severe pain with collapse seventeenth, eighteenth, and twentieth week	—	—	At thirty-sixth week	Sac incised; child removed; placenta in right iliac fossa; sac marsupialized and drained; placenta not separated before death; right secondary abdominal pregnancy	Died; sepsis twenty first day; child cranial asymmetry; did well

Bibliography	Duration of pregnancy	Character of pregnancy	Labour	Complications following labour	Date of operation	Findings at operation; treatment of sac; site of pregnancy	Results
HELLIER, J. B., *Trans. Obst. Soc., Lond.* (1903), 1904, xlv, p. 366	Twenty-eight weeks	Painful pregnancy with much vomiting	None; death of fœtus at twenty-eighth week	Bleeding	Eight months after death of fœtus	Fœtus free among intestines in shrunken amnion; placenta and right foot of fœtus in right tube; tube and fœtus removed; right secondary abdominal pregnancy	Recovery
MACLEAN, E. J., *Trans. Obst. Soc., Lond.* (1906), 1907, xlviii, p. 129	Term	Brown discharge in early months	At term; decidua not shed; death of fœtus followed	Severe abdominal pain, vomiting and pyrexia twenty-five weeks later	Twenty-five weeks after labour	Sac incised; gas and foul fluids escaped; fœtus removed; placenta, antero-inferior; removed; fæcal fistula patent to sac; drainage; posterior colpotomy performed later	Recovery
BLAND-SUTTON, J., *Trans. Obst. Soc., Lond.*, 1903, xliv, p. 316	Term	Severe pain at twelfth week, and at intervals later	None; bleeding at term	Pain and bleeding for three months after term	Sixth months after term	Sac removed entire, with contained fœtus; left rudimentary horn pregnancy	Recovery
Idem; ibid. ...	Term	Normal	At term; decidua not shed; death of fœtus followed	—	Ten weeks after labour	Fœtus in amnion; placenta in right pelvis; fœtus, sac, and placenta removed; right secondary abdominal pregnancy	Recovery
TARGETT, J., *Trans. Obst. Soc. Lond.*, 1900, xlii, p. 276	Term	Normal	At term; decidua not shed; death of fœtus followed	Bleeding for one month after labour	Five months after labour	Sac incised; fœtus removed; sac removed; right rudimentary horn pregnancy	Recovery
GILES, A. E., *Trans. Obst. Soc. Lond.* (1905), 1906, xlvii, p. 114	Thirty-four weeks	Severe pain; collapse and slight bleeding at tenth week	At thirty-fourth week; decidua not shed; death of fœtus twelve days later	—	Five weeks after labour	Sac incised; fœtus removed; placenta posterior; sac removed: left broad ligament pregnancy	Recovery
PAGE, F., *Lancet*, Lond., 1898, ii, p. 1123	Thirty-eight weeks	Severe pain tenth and eleventh week	At thirty-eighth week; decidua not shed; death of fœtus followed	Pyrexia; pain and slight bleeding commenced four weeks after labour	Three and a half months after labour	Sac incised; fœtus removed; placenta on left wall of sac; sac marsupialized and drained; placenta completely separated by twenty-third day; left broad ligament pregnancy	Recovery
MCNUTT, W., *Journ. Amer. Med. Assoc.*, Chicago, 1894, xxiii, p. 278	Term	Normal	At term; decidua not shed; complicated by delirium	—	At term	Child, free among intestines, removed; placenta removed; ligature of right ovarian vessels; hysterectomy for uterine fibroids; delirium continued and patient died forty-eight hours later; right secondary abdominal pregnancy	Died in delirium; child not malformed, did well; weight, 10 lb.

Specimen of a Lower Limb of a Mature Fœtus contained in an Osseous Cyst, and remaining in the Abdomen of the Mother for Fifty-two Years.

Shown by HERBERT WILLIAMSON, M.B.

THIS specimen is from the Museum of St. Bartholomew's Hospital and is thus described in the catalogue:—

3068: "One of the lower limbs of a fœtus of mature growth, which was contained in an osseous cyst and remained in the abdomen of the mother for fifty-two years. A portion of the cyst is connected with the limb; their surfaces were perfectly adherent, but have been partially separated. The several tissues of the limb are dry and compressed, but are of healthy structure. The patient was eighty years old when she died; fifty-two years before she had signs of pregnancy and then of labour for the delivery of this child."

It was previously exhibited at a meeting of this Society, held one hundred and five years ago, the paper was written by Richard Brown Cheston, M.D., F.R.S., of Gloucester, and was communicated to the Society by Sir William Lawrence. Its history is as follows:—

Mrs. Cowles, in the month of December, 1738, was taken in labour with her fourth child. The pains were lingering and went on for three days, but without any advances towards delivery. Dr. Rogers, of Gloucester, was called in, and declared that the child offered for birth, but that he could not deliver it without instruments. This kind of assistance Mrs. Cowles positively refused and declared that if she could not be delivered without instruments, she and the child should die together. For some days the pain seemed to return at intervals, but gradually abated and by the end of the third week all prospect of delivery was over. Great uneasiness continued in her belly and she suffered much mental anxiety from her situation. She continued in a weak state for fully three months afterwards, but gradually recovered. Mrs. Cowles died in the 80th year of age, fifty-two years after the events just recorded; the cause of death was a paralytic stroke, followed by a quick-spreading mortification of the leg.

A post-mortem examination was made by Dr. Cheston. Upon exposing the cavity of the abdomen, a tumour immediately presented, covered by omentum and small intestines, which adhered to it firmly.

When these attachments were separated it presented a complete bony surface which yielded upon striking it the sound of a solid bone. The tumour could be raised from the brim of the pelvis upon which it rested and the uterus was discovered "lying flat at the bottom of the pelvis." After removal, the bony tumour was divided through its middle by a fine amputating saw, and the body of a full-grown fœtus was discovered "in a state of wonderfully perfect preservation . . . the skin, adipous substance and muscles retained much of their natural consistence and characteristic appearances . . . of the membranes, placenta and navel string, I could not discover any remains excepting the insertion of the latter into the body of the child." Dr. Cheston concluded "that the child was contained originally in the uterus and remained in that situation the usual term of gestation."

On reading his account of the autopsy, however, it appears probable that the gestation was either tubo-abdominal or ovarian. "The spermatic vessels were very evident on the right side attached to the superior part of the elongated uterus, but no trace of the ovarium could be discovered. It was only after a very attentive search that I found a cord-like substance about the size of a crow quill, in its external appearance not unlike the vas deferens. Upon discovering that this was tubular I slit it up and found by the elegantly plaited appearance of its internal surface that it was undoubtedly the Fallopian tube, possessing, in every respect, its natural course and appearance and terminating as usual in its fimbriated extremity."

In the same paper Dr. Cheston records a second case of full-time ectopic gestation. This account is based "upon minutes made by Mr. Newell, an eminent surgeon at Cheltenham, with whom I paid the patient several visits." Jane Hawes was a healthy, well made woman about 25 years of age, the mother of two very fine children. In 1795 when her youngest child was 2 years old she again became pregnant. "She went her full time without the smallest inconvenience and at the end of nine months was seized with pain which was supposed to be labour." The pains continued for three days, and "on the third day fever and symptoms of inflammation took place, and the spasmodic pains which had at times been very violent subsided and were succeeded by tenderness of the belly and pain, arising evidently from a new condition of parts. After ten days the inflammatory symptoms began to subside and were succeeded by considerable discharges of a very fœtid and purulent matter." After six months' grave illness the discharge began to diminish and the general health to improve, and in fifteen months she had regained her usual flesh and strength. Five years later she became pregnant again and went into labour in December, 1800. On examination, a solid bony tumour was discovered, fixed firmly to the base of the sacrum, and between this tumour and the pubis was felt the dilated cervix uteri, through which the foot of a child protruded. With great difficulty the child was broken up and delivered. "Suppuration followed with immense discharges of fœtid matter with hectic fever and great emaciation. She lingered on in this wretched state till ulceration took place, which extending downwards in the course of a few months, destroyed the vagina and rectum, and her stools, urine and discharges came seemingly out of one great cavity. During the progress of this wretched case, various bones of the former fœtus were discharged and after lingering in the most cruel sufferings for about ten months, the unfortunate woman died."

Cases of Extra-uterine Pregnancy.

By H. R. ANDREWS, M.D.

IN 1903 a patient, aged 37, nulliparous, married thirteen years, came to me on account of persistent vomiting. She thought that she was about three and a half months pregnant. Her history was that nine years before the periods had ceased, and she had all the symptoms and signs of pregnancy, with nothing to suggest that it was abnormal except that she had abdominal pain. She did not remember having had any acute attack of pain. At the expected time labour pains came on, lasting twenty-four hours, accompanied by a slight amount of bleeding which lasted for a week or two. Fœtal movements ceased when the labour pains began. For the next eight years she had good health and was free from abdominal pains. The abdominal tumour became rather smaller. She sought advice after three months' amenorrhœa, on account of vomiting. A very hard irregularly rounded tumour was found, the upper pole reaching about 2 in. above the umbilicus. There was a soft swelling filling up the pelvis below the fixed hard swelling. Bimanual examination was impossible as the hard swelling was fixed in the brim. Diagnosis: Lithopædion impeding the growth of the pregnant uterus. Operation: The right half of the peritoneal cavity was comparatively free, the left half almost obliterated by adhesions between the lithopædion and omentum and anterior abdominal wall. When the head of the lithopædion was separated from its adhesions in the pelvis a gush of blood came from the pelvis. A living fœtus of about three and a half months was hanging out of a rent in the posterior layer of the left broad ligament. The lithopædion measured 17 in. in length and weighed 3 lb. 5 oz. It was enclosed in amnion and chorion which embraced it closely. The placenta, 4½ in. in diameter, must have been attached to the anterior abdominal wall. The patient did very well.[1]

My second case, in 1906, was a primigravida, seven months pregnant, who had no symptoms except severe vomiting. Before marriage she had had two severe attacks of vomiting lasting for several weeks, said to be due to gastric ulcer. I was asked to see her in consultation, to decide whether labour should be induced prematurely. The fœtal heart was heard. The fœtus seemed to be small for thirty weeks. Bimanual examination revealed nothing abnormal. The patient, who had formerly weighed 7 st., weighed only 4 st. 8½ lb. I refused to induce labour and sent her into the London Hospital. The vomiting soon ceased and the patient put on weight rapidly. She remained in the hospital four weeks. Four months later I was asked to see her again, as she had not been delivered, and was very ill with a temperature of 102° F. Soon after leaving the hospital a blood-stained vaginal discharge began, and she had very severe abdominal pain coming on every five minutes for about an hour. The doctor examined her under an anæsthetic and found nothing abnormal. The fœtal movements ceased just before the abdominal pain began. Four months after the occurrence of the abdominal pains she became feverish and ill, and had extraordinarily offensive stools. On examination the tumour could not be separated from the cervix, but a swelling which felt like an unimpregnated uterus could be felt projecting from the left side of the tumour low down. Diagnosis: Suppuration in a pregnant right rudimentary horn. Operation: The whole uterus was removed. The wall of the tumour gave way during removal and horribly offensive pus escaped. The fœtus which was much decomposed measured 17 in. In 1907 I wrote about this case: "My experience in this case would make me unwilling to leave a full-time ectopic pregnancy alone in the hope that no further trouble would result." The patient made a good though slow recovery.[2]

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[1] *Obstet. Soc. Trans.* (1903), 1904, xlv, p. 461.

[2] *Obstet. Soc. Trans.* (1907), 1908, xlix, p. 209.

In 1911 a nullipara, aged 29, was admitted under my care with an abdominal tumour. Eleven months before her periods had ceased. After nine months' amenorrhœa, during which time she had no pain or discomfort, she had rather free uterine hæmorrhage, and then slight hæmorrhage lasting two months. During the first fourteen days she had pains coming on every half hour. A large smooth tumour of almost stony hardness filled up the abdomen. On the left side of it and behind could be felt the uterus, rather bulky. Diagnosis: Full-time ectopic pregnancy. Operation: The undeveloped right horn was removed, the uterus, both ovaries and left tube being left. The tumour contained a full-time fœtus, macerated, weighing 4 lb. 14 oz. The patient did very well.

In 1902 I saw in consultation in the country, a patient, R. S., whose history was as follows: She was aged 40, had had five children, the last thirteen years before. The periods ceased in February, 1902. During May and June she had a good deal of pain in the abdomen. Labour came on in October and lasted for two days, but no child was born. I saw her in December and found that the uterus, which was slightly enlarged, could be felt apart from a large abdominal tumour. There was no doubt that she had full-time extra-uterine pregnancy. I was not then on the staff of the London Hospital, so I got another obstetric physician to admit the patient into his wards. He considered that there was no need to perform an operation, and the patient was sent back to the country. For the next ten years she was quite well and then began to have abdominal discomfort, with occasional diarrhœa. In January, 1914, she passed some bones, chiefly ribs, *per rectum*. Bones were passed at intervals up to November, 1914, when she was admitted into the London Hospital under my care. Besides the diarrhœa she had had two or three attacks of abdominal pain and vomiting. On one occasion she was thought to have intestinal obstruction. There was a firm, tense, cystic, median swelling rising up half way to the umbilicus. The upper part of it was definitely cystic; the lower part, although soft, seemed to be solid. On bimanual examination the mass was found to be about the size of a cocoa-nut. It lay more in the left side of the pelvis than in the right. It had a slight range of mobility. The uterus, which lay to the right of the tumour, was continuous with it. The rectum was ballooned, and nothing abnormal could be felt *per rectum*. I opened the abdomen and removed a very adherent ovarian cyst, which formed quite half of the abdominal tumour. The sac lay above and behind the uterus and was attached to the pelvic colon by a mass of fibrous tissue in which a flat skull-bone could be felt. The adhesions were so dense that I thought it best to close the abdomen without making any attempt to remove the mass.

This patient has been unusually fortunate in not suffering more severely from sepsis and in escaping intestinal obstruction. The greater part of the fœtal skeleton must have been passed *per rectum*, as the mass left in the abdomen was not much larger than a fœtal head.

(I have since heard from this patient's doctor in the country that she died two years after I had seen her last. "She had several attacks of intestinal obstruction and recurrent attacks of colitis, with passage of mucus, pus, blood, and putrid fluid, sometimes with fœtal bones. She developed symptoms of pyæmia, hectic temperature, endocarditis, pleurisy, and finally empyema.")

Besides these, I saw two cases of full-time extra-uterine pregnancy operated on by the late Dr. Herman some months after term. No infection had occurred. In one case the sac was removed as if it had been an ovarian tumour; in the other the uterus had to be removed as well, as the placenta was widely attached to it.

In some cases of living ectopic pregnancy, especially pregnancy in a rudimentary horn, diagnosis may be difficult, or, rather, examination unless very carefully made, possibly under an anæsthetic, will not reveal anything abnormal.

I am impressed by Mr. Gordon Ley's findings that thrombosis may not occur until many months after the death of the fœtus. As infection may occur within the first few months after the spurious labour it seems doubtful that there is any advantage to be gained by delay in operating.

Case of Extra-uterine Pregnancy.

By Bellingham Smith, F.R.C.S.

Attention should be drawn to the difficulties of diagnosis between normal pregnancy, unilateral distension of the uterus, and pregnancy in a horn. My patient, who was under my care for five months, went to full time and had labour pains which passed off. About this time the child died. Three weeks later the abdomen was opened, the sac exposed and opened, and the child which was much deformed was removed.

The placenta, which was in the lower part of the sac was peeled off with very little oozing of blood. The superfluous parts of the sac were removed, the lower part drawn up and sewn in the lower angle of the wound and the wound closed. The sac was packed for twenty-four hours with gauze, which was then removed and the sac contracted up and the wound closed without any sepsis or further trouble. In view of the easy operation and the successful result I think that in any future case I shall follow the same procedure.

Two Cases of Full-term Extra-uterine Gestation.

By W. GILLIATT, M.S.

Case I.—J. S., aged 58, was admitted to the Middlesex Hospital on January 2, 1907, under the care of Sir Alfred Pearce Gould, to whom I am indebted for kind permission to publish this case. I was fortunate in being the dresser to this patient. The patient had five children, aged respectively 30, 28, 26, 24 and 18 years. The first confinement was terminated by forceps delivery, the remainder were quite normal. The different medical men who attended her in her last four labours all called her attention to an abnormal swelling in the abdomen. She thought that the tumour resulted from an accident which occurred twenty-eight years before, when she was carrying a bath downstairs, and fell with it. Soon after the accident she noticed a lump in the abdomen on the left side of the middle line, about the size of a hen's egg. The swelling had been growing ever since it was first noticed. Questioned after the operation, the patient could not remember whether she had any grounds for believing herself pregnant at the time of the accident. There was no trouble until August, 1906, five months before admission to hospital, when an abscess formed in the middle line of the abdomen, above the umbilicus. Six weeks later this abscess burst at a point 2½ in. above the umbilicus and ¼ in. to the left of the middle line, and pus had escaped freely from this sinus up to the time of operation. On examination of the abdomen, a tumour arising from the pelvis can be felt extending up to the umbilicus. The tumour is rounded and irregular in consistency, the upper part being hard, and the lower portion definitely cystic. Pressure over the cystic portion resulted in the discharge of pus from the sinus above the umbilicus. *Per vaginam* the tumour moved with the uterus, and was felt to be in front of the uterus. A sound passed 2½ in. Streptococci were obtained in pure culture from the discharge from the sinus. The abdomen was opened on January 12, 1907, and the tumour was found to be attached to the left side of the uterus, between the layers of the left broad ligament. The omentum and several coils of intestine were adherent to the tumour. The tumour was separated from these structures and removed; in doing this the sac was ruptured, and a considerable amount of pus escaped into the pelvis. The patient died, three weeks after the operation, from broncho-pneumonia secondary to a pelvic abscess.

The specimen is that of a rounded swelling, almost as large as a football. A window has been cut in the wall of the sac through which fœtal remains can be seen. On the opposite side of the swelling there is some flattening, and it is in this portion that the abscess cavity was found.

Case II.—B. S., aged 25, was admitted to the Middlesex Hospital late at night on December 7, 1915, having been brought in from the out-patient maternity district by the obstetric resident. In the absence of Mr. Berkeley I was asked by Mr. Bonney to see the patient. The history that could be obtained was almost negligible, as the patient herself spoke Flemish only, and her husband Flemish and a little French. She had had one child, eighteen months previously; the labour was normal. When first seen the patient had been in labour seven hours, and the midwifery clerk, noticing that she had an abdominal tumour in addition to the full-term uterus, obtained her admission to the hospital. By the aid of an interpreter it was subsequently discovered that four years previously the patient was living in Paris and thought herself pregnant, but the child was never born. She saw many doctors, between twenty and twenty-five, some of whom thought she was pregnant, and others who did not, and finally it was decided that she was not pregnant. No history of any attack of abdominal pain during the pregnancy could be obtained. On examination of the abdomen a full term uterine pregnancy was found, the uterus lying more to the right side of the abdomen than normally. On the left side, rising out of the pelvis and resting in the left iliac fossa, was a rounded tense swelling, which was pushing the uterus to the right, and which appeared to be impacted in this position. The child was presenting by the breech, which was resting in the iliac fossa. *Per vaginam* the cervix was very high and about the size of a florin, the membranes unruptured and bulging. The presenting part could not be reached. The abdominal tumour could be felt bimanually, but could not be moved. A diagnosis of ovarian tumour obstructing labour was made, and operation advised. The abdomen was opened, and the tumour was felt to be a sac containing bones. The sac was lying between the layers of the left broad ligament, and was adherent to the omentum and colon. The adhesions were divided and the tumour was removed. Cæsarean section was done, and a living female child delivered. Except for suppuration in the superficial stitches the patient made an uninterrupted recovery and left the hospital with her infant five weeks later.

The specimen on removal was not quite rounded in shape, and measured 8 in. in one diameter and 6½ in. in another. Crepitus could be easily felt through the sac wall. On opening the sac it was found to contain the remains of a small fœtus, probably of about eight months' development. The soft tissues of the child had undergone pronounced softening, similar to that seen in advanced maceration. The tissues of the scalp had disappeared, and the fœtus was surrounded by a viscid fluid of brownish colour.

Case of Extra-uterine Pregnancy.

By J. D. Malcolm, F.R.C.S.Ed. (President).

A patient, aged 33, well nourished and generally healthy, was admitted to the Samaritan Free Hospital, on September 25, 1915, on account of an increasing swelling of the abdomen, noticed since the previous April and causing some pain of recent date. Menstruation was regular until February, 1915, after which there was amenorrhœa for seven weeks, followed by slight bleeding every day for three months. There was no further loss until a brown discharge began a fortnight before the patient was first seen. Constipation and frequency of micturition increased as the swelling grew larger. There was a medium sized tumour, the size of a seven to eight months' pregnancy, and the breasts contained milk. No thrill was felt on percussion. No souffle or fœtal heart sound was heard. It was thought that the outline of the buttocks of a child could be felt above, and something like a fœtal head was found in front of a very soft cervix with a slightly patulous os uteri. In consultation differences of opinion were expressed, and as the patient was not suffering seriously she was discharged and kept under observation. Occasional slight hæmorrhages from the vagina occurred, and two months later the abdominal mass was somewhat smaller. Otherwise the conditions were unchanged except that the supposed fœtal head was recognized as the body of the uterus. This was verified by passing a sound which went in 3¾ in.

On December 20, 1915, the abdomen was opened. The tumour was redder than an ovarian cyst. There were some adhesions of omentum and cæcum and the vermiform appendix was spread out over the mass. These parts were easily separated by rubbing and the tumour was gradually separated. It ruptured at one point where adhesions were not very firm and some greyish fluid escaped. There did not seem to be any definite base more adherent than other parts except at the side of the uterus. The outer edge of the round ligament was stretched over the upper right side of the tumour as a band which was divided. The attachments to the uterus were close but offered no serious difficulty. The Fallopian tube was divided and appeared healthy. The remains of the broad ligament were drawn over the side and back of the uterus. The patient made an uninterrupted recovery and was discharged three weeks after the operation.

The specimen was set aside unopened for future examination and was, unfortunately, lost, but a well-developed child's hand protruded from a rupture in its wall. Except for this and the colour of the part removed and the merging of the Fallopian tube in the tumour there was nothing to distinguish the operation from one for the removal of an adherent ovarian tumour. On the outside of the mass the position of the placenta could not be detected by sight although it was obvious to palpation. The Fallopian tube, although healthy where it was divided, soon merged in the mass which contained the fœtus. No separate ovary was seen on the affected side.

Specimen from Case of Extra-uterine Pregnancy.

By Cecil Marriott, M.Ch.

(Shown by the President.)

A woman, aged 41, who had four children, ceased to menstruate for nine months, after which she appeared to be in labour, but she was not delivered and the signs of labour passed off. During the following three months there was a red vaginal discharge, and at the end of February the patient was sent as a case of degenerating fibroid tumour to the Leicester Royal Infirmary, under the care of Mr. Cecil Marriott. A large tumour occupied the pelvis and rose into the abdominal cavity. The uterus was recognized in the right iliac fossa with a sulcus between it and the abnormal mass. There was no uterine souffle and, of course, no fœtal heart sounds. The breasts were small, flabby, and altogether atypical of pregnancy.

On opening the peritoneal cavity a mass was found in the left pelvic region rising up into the abdomen and pushing up the sigmoid flexure which lay along its upper surface, being very adherent for about 12 in. and disappearing into the pelvis on its extreme right side. The uterus was considerably enlarged and pushed out of the pelvis to the right. The mass was easily shelled out from the pelvic wall and freed from the sigmoid and uterus with some difficulty, many vessels requiring to be ligatured at the attachment to the uterus. It was difficult to be sure about the relations of the parts, but the placenta seemed to be attached to the left side of the uterus and to the back of the broad ligament. The mass appeared to be between the layers of the broad ligament. The Fallopian tube lay upon the upper surface of the tumour. It was a little swollen and curved round rather acutely towards the uterus. The left ovary was not seen apart from the specimen. This consists of a sac which has been opened and a fœtus attached to the placenta. The fœtus shows signs of decomposition in the peeling of epithelium from its back. It is much distorted, but possibly this is due to pressure only. The amniotic fluid, of which there was no very large quantity, was of brownish colour. The sac is well developed except where it covers the placenta. At this part it has been separated over a considerable area.

The patient has made a good uneventful recovery.

The specimen has been presented to the Royal College of Surgeons.

DISCUSSION.

Dr. ARTHUR GILES: Mr. Gordon Ley's paper has involved a considerable amount of work, and the statistical tables will be of permanent value. I shall confine my observations to three points:—

(1) *The Ways in which a Full-time Extra-uterine Pregnancy can occur.*—My own view is that every case begins as a tubal or an ovarian pregnancy: I am sceptical as to the possibility of an oösperm dropping free into the peritoneal cavity and developing there. When a gravid tube ruptures the sac

may be extruded towards the peritoneal cavity, resulting in what I regard as a "primary abdominal," but what Mr. Ley has described as a "secondary abdominal" pregnancy. If the rupture takes place into the broad ligament, a mesometric pregnancy occurs and may go to term as such; on the other hand, there may be a secondary rupture into the peritoneal cavity, resulting in a true "secondary abdominal" pregnancy. Another possibility is a tubal abortion of such a character that the sac is extruded from the fimbriated end of the tube without disturbance of the placenta. This is probably the mode of origin in a case that I recorded in the *Obstetrical Transactions* for 1905. At the time of the operation it appeared to be a mesometric pregnancy; but on examination of the specimen later by the Pathological Committee of the Obstetrical Society, the tube and mesosalpinx were found almost unaltered; and the sac lay external to the ovary and the tubal ostium, between the broad ligament and the lateral pelvic wall. As a rule, the surgeon in these cases has little leisure or opportunity to identify the precise anatomical relations; he will be much more concerned to get through the operation as quickly and safely as possible.

(2) *Diagnosis.*—I quite agree that in some of these cases the diagnosis is most difficult. In others it is conspicuously easy. Before full-time a diagnosis may be suggested by two points; the first is an abnormally easy palpation of the fœtus, in cases where it is lying free in the abdomen, covered only by the amnion. Such was a case in which I assisted Sir John Bland-Sutton at the Chelsea Hospital for Women; the child was lying free enough to clutch the mother's intestines. Sir John recorded the case in the *Obstetrical Transactions* for 1903. The second point of diagnosis is resonance over the front of the abdomen right down to the pubes. This feature will never occur with an intra-uterine pregnancy; and it was very noticeable in my own case. When spurious labour takes place, the diagnosis seldom presents much difficulty.

(3) *Treatment.*—Probably the most debatable question is the time when the operation should be undertaken. Mr. Ley's figures seem to me to be eloquent on this point, since he has shown that the maternal mortality is about 4 per cent. in cases operated on later than eight weeks from the death of the fœtus; as against 26 per cent. in cases operated on while the fœtus is living and 20 per cent. in cases operated on within eight weeks of the death of the fœtus. Notwithstanding the fact that some extra-uterine children have survived their birth, and perhaps even grown up, I still hold the opinion that I expressed in reporting my case in 1905, that the extra-uterine fœtus is not, in insurance phrase, a "good life." Mr. Ley's figures corroborate this view, since he has found that no fewer than 46 per cent. of extra-uterine children presented some deformity; and of those born alive 18 per cent. died within a few weeks. The fœtus is not, therefore, of such value as a "prospective citizen," that it is worth while submitting the mother to increased risk to save the child. Dr. Handfield-Jones, in discussing my specimen mentioned that he had two children delivered alive, but both the mothers died. It appears to

me to be demonstrated both by experience and by Mr. Ley's figures that it is safest for the mother if operation be delayed a few weeks after the child's death.

In conclusion, the variety of the conditions found justifies the warning that a surgeon who meets with an easy case must not too lightly assume that the next will be equally easy. Such an operation as Mr. Ley's second case, where the sac and placenta had to be removed before the primary vessels supplying them could be got at and secured, is among the most difficult and dangerous operations in surgery.

Dr. HEDLEY: I think the greatest danger in dealing with cases of full-term extra-uterine pregnancy is from hæmorrhage, and in comparison the danger of infection of the dead ovum is small. In midwifery the general rule is to consider the mother's life first: I therefore feel that operation in these cases should not be undertaken until two or three months after the death of the child unless there is some very urgent reason. By waiting two or three months after the placental circulation has ceased there are good grounds for hoping that thrombosis will have taken place in the maternal vessels supplying the placental site, and this certainly is so in the majority of the cases recorded. In cases which have to be operated upon while the child is living or soon after death I should advise leaving the placenta behind and closing the abdomen unless the placenta was attached in a position favourable for ligature of the vessels leading to its site.

Dr. FAIRBAIRN: I have operated on three cases of advanced extra-uterine gestation. Of these, two were fatal, and in one both mother and child survived. As the first is reported in full in the *Journal of Obstetrics and Gynæcology of the British Empire*, 1906, x, p. 599, I need only say that six weeks after term the mere separation of the edge of the placenta was followed by bleeding so severe that the patient was sent back to bed with the abdomen stuffed with gauze and towels and that she collapsed and died shortly after a second attempt to remove the placenta, made a week later, and with precisely the same result. The second case (in 1911) was not full time but about seven months, and here again the patient collapsed some four hours after operation as the result of the severe hæmorrhage which had occurred during the separation of the placenta. The sac was adherent to omentum, intestine and fundus uteri, the placenta being anterior. The abdomen was reopened as the patient's condition suggested further hæmorrhage, but none was found. The third case (in 1913) I will record more fully. The patient was a woman, aged 28, who had had one child at the age of 18, had been a widow for seven years and remarried in 1912. She had no history suggestive of salpingitis or other pelvic trouble. Her last period was in November, 1912. In December and January she had morning sickness and swelling of the breasts, attacks of epigastric pain but no history of pelvic pain. In May and June there were three slight losses of blood, and with the last what she thought were labour pains. At the end of June a doctor was called in who sent her into St. Thomas's Hospital. On admission she was found to be somewhat emaciated and had been vomiting for some days. She had intermittent fever up to 102° F., pulse-rate 116 to 124, some albumin in the urine but no blood. There was a *Bacillus coli* infection of the urine. The fœtal parts as felt *per abdomen* did not suggest an extra-uterine pregnancy and her condition was at first thought to be a pyelitis of pregnancy. The vomiting continued, rectal salines were not retained, and abdominal distension became marked. Vaginal examination at once raised the suspicion of the pregnancy being extra-uterine, as though the body of the uterus could not be accurately differentiated, fœtal parts could be made out behind and below the cervix. On the fourth day after admission (July 1) the continuance of the vomiting with abdominal distension was suggestive of intestinal obstruction and together with the marked deterioration in her general condition made it clear that something would have to be done at once. Examination under anæsthesia made the diagnosis clear, the body of the uterus being identified in front of the fœtus. This was confirmed when the abdomen was opened, when the uterus was found to be nearly the size of a four months' gestation; behind it and to the right and apparently enclosed in the right broad ligament was the sac containing the fœtus. The sac was opened and the fœtus removed. The placenta was situated on the right broad ligament, a small portion only extending on to the postero-lateral pelvic wall. Hæmorrhage was easily controlled and the sac was removed by clamping and ligaturing the broad ligament. Some hæmorrhage from the area of placental attachment not the broad ligament was controlled by underrunning it with sutures. A plug was left in to control some oozing which continued. Intravenous saline infusion of 3 pints was given during the operation and the patient left the table in fair condition; pulse-rate 120. The child, a male, weighed 3 lb. 14 oz.; respiration was soon established after a hot bath. From examination of the sac it appeared that the pregnancy had been primarily tubal and either had ruptured intraligamentarily with a secondary rupture into the abdomen or had been extruded from the tube and obtained a secondary attachment to the broad ligament. The patient's convalescence was retarded by the *Bacillus coli*, pyelitis and cystitis, but she left the hospital in good condition on August 15 with her child now weighing 6 lb. 9 oz. The child was watched for a year in the baby clinic and developed normally. From this small experience I would say that the old instruction to wait for the death of the child is useless: the most straightforward of my cases was the one with the child that survived: the most difficult the one in which the child had been dead for six weeks. The trouble depends almost entirely on the situation of the placenta. When the sac and its attachments can be ligatured and removed the operation is straightforward. When the placenta has to be separated from some irremovable part the bleeding, even two months after the death of the child, may prevent the operation being completed.

Dr. F. J. McCann: It would be easy to formulate rules for surgical treatment if the exact conditions met with in the abdomen were known before the actual operation. There are, however, two important principles which should be followed—viz., preliminary ligature of the chief vessels supplying the placenta and fœtal sac, and rapid separation of the placenta. In one of my own cases the hæmorrhage would have been difficult to control if these principles had not been followed. The ovarian vessels were ligatured high up, a clamp was placed close to the lateral border of the uterus, and a large artery coursing down the posterior wall of the uterus towards the placenta was ligatured. The placenta was then rapidly separated from the floor of the pelvis and the sigmoid colon, and a gauze pack at once introduced to arrest the bleeding. The bleeding from the colon was arrested by over-stitching with catgut, thus infolding the raw area on the wall of the bowel. The placental sinuses bleed freely when the placenta is partially separated, or when they are partially torn, whilst if the placenta be rapidly removed in its entirety, it is remarkable how soon the bleeding ceases. Many examples of extra-uterine fœtation are described as being intra-ligamentary or broad ligament pregnancies. I do not say that rupture into the broad ligament may not occur, but it is relatively rare. It is easy in the hurry of an operation to omit to observe accurately the anatomical relations of the fœtal sac, and to assume that its position is between the layers of the broad ligament. In many of the recorded examples the fœtal sac was removed without difficulty. If the sac had really developed between the layers of the broad ligament there would have been considerable difficulty in its removal. These sacs have false capsules comparable to what is found in certain "broad ligament tumours," and the broad ligament is stretched over them like a hood. This arrangement favours enucleation, and I have actually seen this false capsule in process of formation. Mr. Gordon Ley has referred to an example of abdominal pregnancy which I have recorded, and which I believe to be an example of primary abdominal pregnancy. It is interesting to recall the fact that the older writers believed in the existence of both ovarian pregnancy and primary abdominal pregnancy. Now the existence of ovarian pregnancy, although denied for many years, has been conclusively confirmed by numerous observers. I believe that this will also be true of primary abdominal pregnancy. Mr. Gordon Ley further asks for information regarding the rush of "waters" associated with the onset of false labour in my case.[1] This was liquor amnii and not urine, and in all probability it had escaped through the patent Fallopian tube or tubes as a result of the violent uterine and probably tubal contractions associated with the false labour.

Dr. LAPTHORN SMITH: My operative experience of extra-uterine gestation is limited to fifty-five cases, three of which died and fifty-two recovered. My invariable rule has been to operate the very day and in some cases within an hour of a reasonable evidence of the condition being present, which in most cases was a furious abdominal hæmorrhage. One of my cases, not included in the above because not operated on, occurred in my first year of practice in a woman in whom labour was going on violently at the expected date. The empty uterus could be felt quite distinctly as well as the child's head pushing it to the right. Upon my telling the people why the baby could not come and asking for a consultation with an older man, I was promptly dismissed from the case. Another practitioner who at that time had never heard of such a thing, told them that there was nothing the matter, and the patient actually got smaller and smaller for several years, when I lost sight of her and she could not be traced. The second case, not my own, which made a great impression upon me, occurred some twenty years later. One of my hospital colleagues, a clever young general surgeon, operated in the case, which was that of a full-time extra-uterine, in which the child was alive. The mother was most anxious to save the child. The abdomen was opened under modern methods, and in a few minutes the child was lifted out without any more difficulty, and, indeed, with less difficulty than in doing a Cæsarean section. The placenta, a large one, was adherent to many coils of small and large intestine, and not at all to the broad ligament. The blood supply of the bowel was enormously increased. If he had left the placenta alone, after tying and removing the cord and tying the marsupialized membranes or sac and quickly closed the abdomen, the woman would probably have been alive to-day. After the removal of the child, which was the main object, she was in splendid condition. But he had not learned one of the most difficult things in abdominal surgery—namely, to know when to stop. He began to detach the placenta. In a moment the abdomen was filled with blood. It was too late to stop, and he went on thinking that, as in the case of placenta prævia, the bleeding would cease when detachment was complete. But there was no contracting uterus to close the gaping sinuses, and in spite of packing and efforts to replace the lost blood, the poor woman made a tragic ending on the operating table. Why with such a case before our mind's eye should we deliberately increase the mortality from 5 to 95 per cent., just for the sake of extracting the placenta? It has been there for nine months, why not leave it there a few months longer or altogether? As a means of packing enormous sinuses which have no power to close themselves what better plug can we use than the one which has done the work so well for all those months? What will happen to it if the operation has been done under modern asepsis? We know quite well from the hundreds of lithopædions to be seen in museums all over the world. The child and the placenta in time become mummified, because the peritoneum has a certain digestive or absorptive power, and gradually drinks up every scrap of moisture and perhaps absorbs some of the organic structures. The placenta is a part of the child, not of the mother, and as soon as the cord is tied the child's heart ceases to send blood into it, and in sympathy the mother's heart emits less and less blood into the coils of intestine which were feeding her offspring. The vascularity of the whole area diminishes daily, and at last may be so slight that an appeal must be made to the omentum to send a few minute blood-vessels into it, as in the case of a twisted ovarian cyst which is absolutely cut off from its blood supply, and which I have several times removed without tying a single artery. To my mind there is only one thing to do, get in, and get out with the baby as quickly as possible. And there is only one thing not to do, namely, to start a hæmorrhage which we know beforehand there is no means of stopping as long as the heart can beat.

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[1] *Proceedings*, 1916, ix (Sect. Obst. and Gynæcol.), pp. 109-115.

Mr. GORDON LEY (in reply to Dr. Arthur Giles): I cannot understand Dr. Giles's aversion to primary abdominal gestation, to which I can see no histological objection. In my study of the literature I came on several cases of which no other explanation was possible. In one, uterus and tubes were normal, the ovum being embedded between the liver and stomach; in another, in front of the left kidney. I do not feel that the leaving of the placenta in the abdominal cavity, with closure of the sac over it and of the abdomen is an ideal operation. I found only three cases in the literature in which this had been done, and in one of these the sac had to be drained *per vaginam* at a later date. The risk of leaving a dead structure, possibly infected, in communication with large blood sinuses, is considerable, and it is better to marsupialize the sac and pack with gauze.

Section of Obstetrics and Gynæcology.

President—Mr. J. D. MALCOLM, F.R.C.S.Ed.

A Fibrolipoma weighing 13 lb. which Invaded or Originated in the Right Broad Ligament.[1]

By W. S. A. GRIFFITH, M.D.

THE patient, aged 57, was admitted to Martha Ward, St. Bartholomew's Hospital, under the care of Dr. Griffith, in May, 1916. Menstruation, generally normal, ceased at the age of 40. Three children; one miscarriage. Since the climacteric she had suffered from abdominal pain, which continued at intervals to the day of operation.

The tumour, which was very elastic and tender, occupied the right half of the abdomen from the pelvic brim to near the costal margin, and to the left of the middle line. The cervix, enveloped in the inverted vagina, protruded from the vulva. The tumour was exposed through an incision in the middle line; it was extraperitoneal, the intestines being displaced by it to the left. It occupied the right broad ligament, displacing the uterus to the left, and had the right Fallopian tube stretched over it. It was enucleated after incision of its peritoneal covering; the lower part occupied the right broad ligament. The large cavity left was obliterated by catgut sutures, and without drainage, and the patient made an uninterrupted recovery. The prolapse was cured two months later by anterior and posterior colporrhaphy.

Lipomata of the broad ligaments are very rare. Doran, in his well-known paper on "Retroperitoneal Tumours,"[2] refers to one only, that of Treves.[3]

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[1] At a meeting of the Section, held June 5, 1919.

[2] *Brit. Med. Journ.*, 1904, ii, p. 1075.

[3] *Trans. Clin. Soc.*, 1893, xxvi, p. 101.

Specimen of Subperitoneal Lipoma weighing 16¾ lb.

By T. G. Stevens, F.R.C.S.

THIS, the second specimen of the kind which the writer has met with in the past eighteen months, was removed from a single woman, aged 35. She complained only of abdominal enlargement and some aching in the left side. The periods were not quite regular, the intervals being four or five weeks, but were not otherwise abnormal.

On examination there was a large abdominal tumour, filling the whole abdomen, which felt like a cyst and fluctuated freely—even gave a thrill in parts. There was some dullness in each flank, which suggested free fluid as well. The diagnosis of an ovarian cyst was made, and owing to the patient being very thin, and the possible presence of free fluid, it was thought to be possibly malignant.

She was admitted to St. Mary's Hospital, and upon opening the abdomen the true character of the tumour was at once seen. It presented a smooth surface with movable, red peritoneum over it. The ascending colon and cæcum were found in the *left* iliac region running over the tumour and movable on it. The tumour dipped into the pelvis and reached up to the diaphragm. A vertical incision 6 in. long was made over the tumour, the peritoneum only being divided. The tumour was then enucleated, no difficulty being met with until the right renal region was reached. Here some cutting of fibrous bands had to be done, and in doing it the kidney was cut into. This proved to be a fortunate accident as it enabled the kidney, which was completely enveloped in fat, to be identified. It was shelled out from its capsule, the ureter was identified and preserved, and the rest of the tumour was then easily enucleated. The kidney and ureter were dropped back into the loin after the accidental incision in the kidney had been sewn up. A stab wound was made in the loin and a drainage tube was passed into the large cavity left after enucleating the tumour. The incision in the peritoneum was sewn up and the ascending colon then resumed its natural position.

The patient bore the operation very well, except for a few moments when the tissues around the kidney were being pulled upon, when the breathing became very shallow. She rallied well after some saline infusion and made an uninterrupted recovery. The tumour after removal filled an ordinary wash-hand basin and weighed 16¾ lb. It consisted entirely of fat and fibrous tissue strands and evidently originated in the perirenal fat on the right side.

The description of the tumour and the operation in this case is practically identical with that of the first case. The tumour in that case weighed 16 lb., started in the same way around the right kidney, displaced the colon in exactly the same way, and was removed without any difficulty at all. This patient also recovered without any bad symptoms. In neither case was the true nature of the tumour diagnosed, but in the first case, it was not supposed to be an ovarian cyst on account of its peculiar consistence. Neither was it thought to be ascites—in fact no diagnosis was made before opening the abdomen. It is probable that these tumours cannot ever be diagnosed with any certainty before removal. The fat in them is fluid at the body temperature and will always simulate fluid either cystic or free. It is remarkable how easy was the removal in these two cases and how few blood-vessels were met with which had to be tied: about six in the first case and three only in the second.

Case of Congenital Teratoblastoma of the Vulva (Rhabdomyoma).

By Gordon Ley, F.R.C.S.

M. J., AGED 5 weeks. This child was brought to me with the following history: At birth a large tumour was noticed by the midwife, replacing the vulva. The child was taken to a medical man and the condition was pronounced as incompatible with life. The child was eventually brought to me when she was 5 weeks old. The tumour had increased considerably since birth and in part its surface had ulcerated.

On examination there was a large tumour lying beneath the skin of the mons veneris, labia majora, vestibule, the anterior parts of the labia minora and the clitoris, displacing these structures forward. Projecting posteriorly behind the urethral orifice, which was seen to be a slit slightly to the right of the midline, was a soft, reddish brown, superficially ulcerated mass, which projected forwards and had a deep attachment passing posteriorly to the urethral orifice. On lifting up the tumour there appeared to be a vaginal orifice in the form of a transverse slit extending the whole width of the posterior margin of the tumour.

I came to the conclusion that it was a congenital tumour, probably teratomatous, growing from the region of the floor of the urethra, and decided that the child would certainly die as a result of ulceration of the tumour if left, and might conceivably recover if the tumour was successfully removed.

On December 20, I excised the tumour with its pedicle, which included the urethra itself, and brought down the neck of the bladder, stitching it to the surrounding skin and posteriorly to the greatly widened vaginal orifice. The child stood the operation extremely well, but suffered severely from shock about half an hour later and died suddenly.

AUTOPSY.

The bladder, or urethral, orifice has a circumference of 0·7 cm., and admits a large probe. There is no thickening or sign of tumour tissue in the lower urinary outlet, nor elsewhere in the uro-genital tract.

The vaginal orifice is 1·5 cm. in diameter. There is very slight hypertrophy of the bladder and very slight dilatation of the renal pelves. There is anæmia of lungs and all organs. A poorly nourished, small, female infant.

PATHOLOGICAL REPORT.

On the surface of the upper part of the specimen are seen the labia majora, the anterior part of the labia minora, the clitoris and the vestibule.

Bulging forwards from between these in front, and the anterior margin of the vaginal orifice behind, is a puff-ball shaped mass, 5·4 cm., by 4·7 cm., by 2 cm. high. The posterior aspect of the pedicle of this mass is covered by a demilune (0·4 cm. at widest) of thin, smooth mucosa, corresponding to the anterior margin of the vaginal orifice. The remainder of the surface of the mass is pink and finely granular.

Beneath the clitoris, labia and vestibule is a second mass, which measures 3·5 cm. by 5·5 cm. by 3·5 cm. deep. The urethra lies between the two masses and opens at a point 0·5 cm. to the right of the middle line. It has been removed apparently in its whole length, its lower end has been partially split open. It measures 2·5 cm. long and has a diameter of 1·3 cm. The canal is lined by smooth mucosa. Both masses are of elastic consistency.

On the posterior surface of the specimen the masses are seen to be continuous. At one spot is an area 1·5 cm. in diameter which shows a

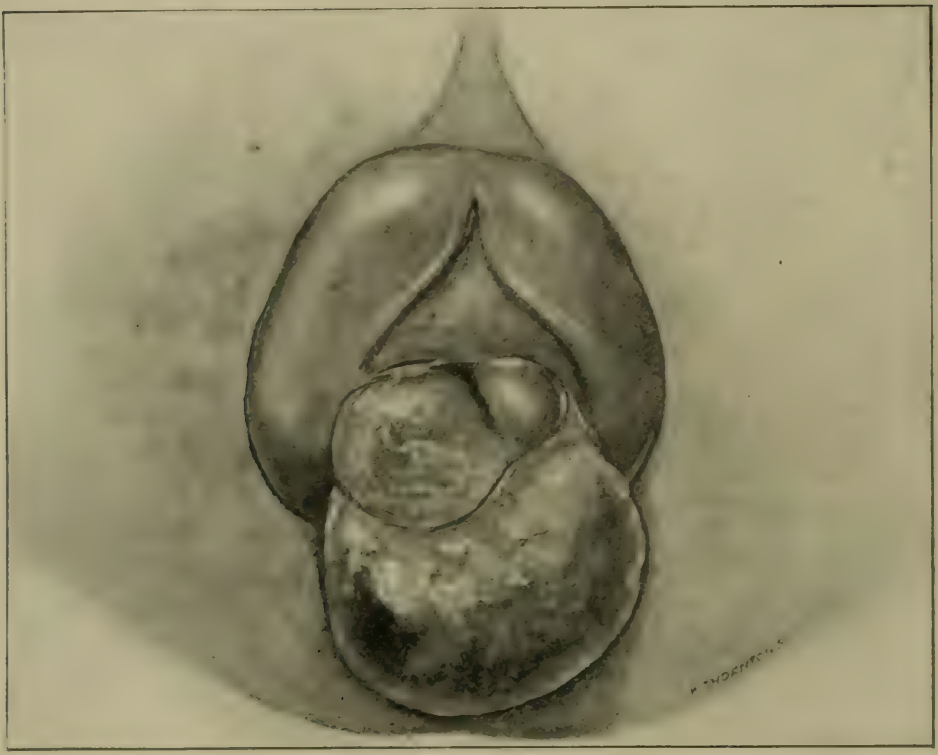


Fig. 1.

Anterior view of vulva.

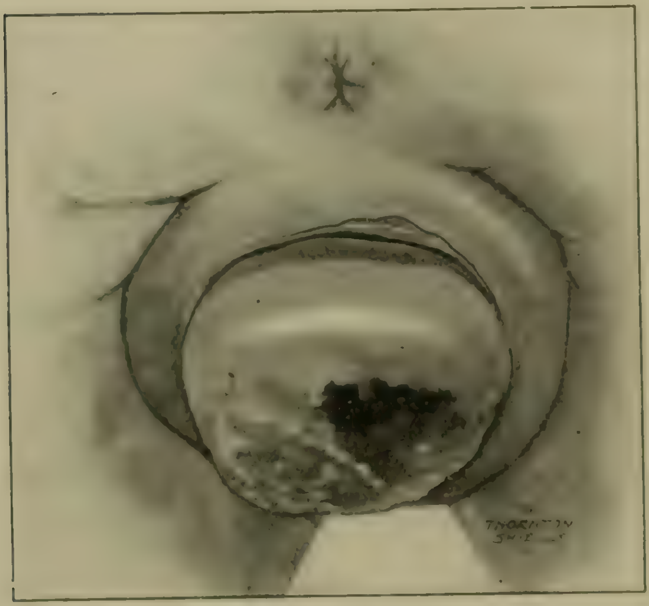


Fig. 2.

Posterior view of vulva.

cut surface made by the knife at operation. This area lies below and to the right of the urethra. Its cut surface is elastic and shows whorls of narrow grey lines in a glistening pink gelatinoid ground. The remainder of the posterior surface is encapsulated. The posterior surface has evidently been shelled out at operation with the exception of a pedicle severed by the knife.

A vertical antero-posterior section through the mid-line of the specimen again shows that the two masses are continuous. The cut surface of the mass beneath the clitoris shows whorls of narrow white lines in a sunken matrix of grey translucent gelatinoid tissue. That of the puff-ball like mass is very much softer, very translucent, yellowish and gelatinoid, and exudes a slimy fluid.

Sections were taken for microscopical examination: (*a*) from the mass beneath the clitoris; (*b*) from the pedicle severed at operation; (*c*) from the puff-ball shaped mass.

Microscopical Description.

Section A.—On one surface is seen the stratified squamous epithelium of the epidermis, beneath which is a vascular cellular dermis. In this layer can be seen two sebaceous glands and in the deeper layers a few Paccinian corpuscles. Beneath the dermis lies the tumour; there is, however, no sharp line of demarcation between the two, numerous islets and strands of the tissue of the tumour lying in the deeper part of the dermis. The tumour consists of a loose fibrillo-cellular matrix forming its greater part. This consists of small spindle and oat-shaped cells, with relatively large spindle nuclei, closely applied to a loose mesh-work of very delicate fibrils. Lying in this matrix are many narrow strands or groups of strands of muscle. These muscle bundles consist of cells of three types:—

(1) Chiefly in the deeper layers of the dermis, but also in the depth of the growth, are fibres which are of somewhat smaller diameter than normal voluntary muscle fibre, but are otherwise typical. The longitudinal and transverse striation is very distinct and the oval nuclei are peripheral and lie at a considerable distance from one another.

(2) The great majority of the bundles of muscle consist of somewhat broader fibres in which the nuclei lie in the centre. The nuclei are round in cross section, and round, oval or oblong in longitudinal section. They are always more numerous than in normal muscle and frequently are so numerous that they form a continuous central chain the members

of which are in contact. The nuclei lie in a core of clear cytoplasm; external to this nucleated core is a narrow peripheral zone of cytoplasm which is clearly striated longitudinally containing a few parallel longitudinal fibrils. These fibrils are very conspicuous in transverse section. Cross striation of the peripheral zone is seldom visible but is certainly present in a few examples.

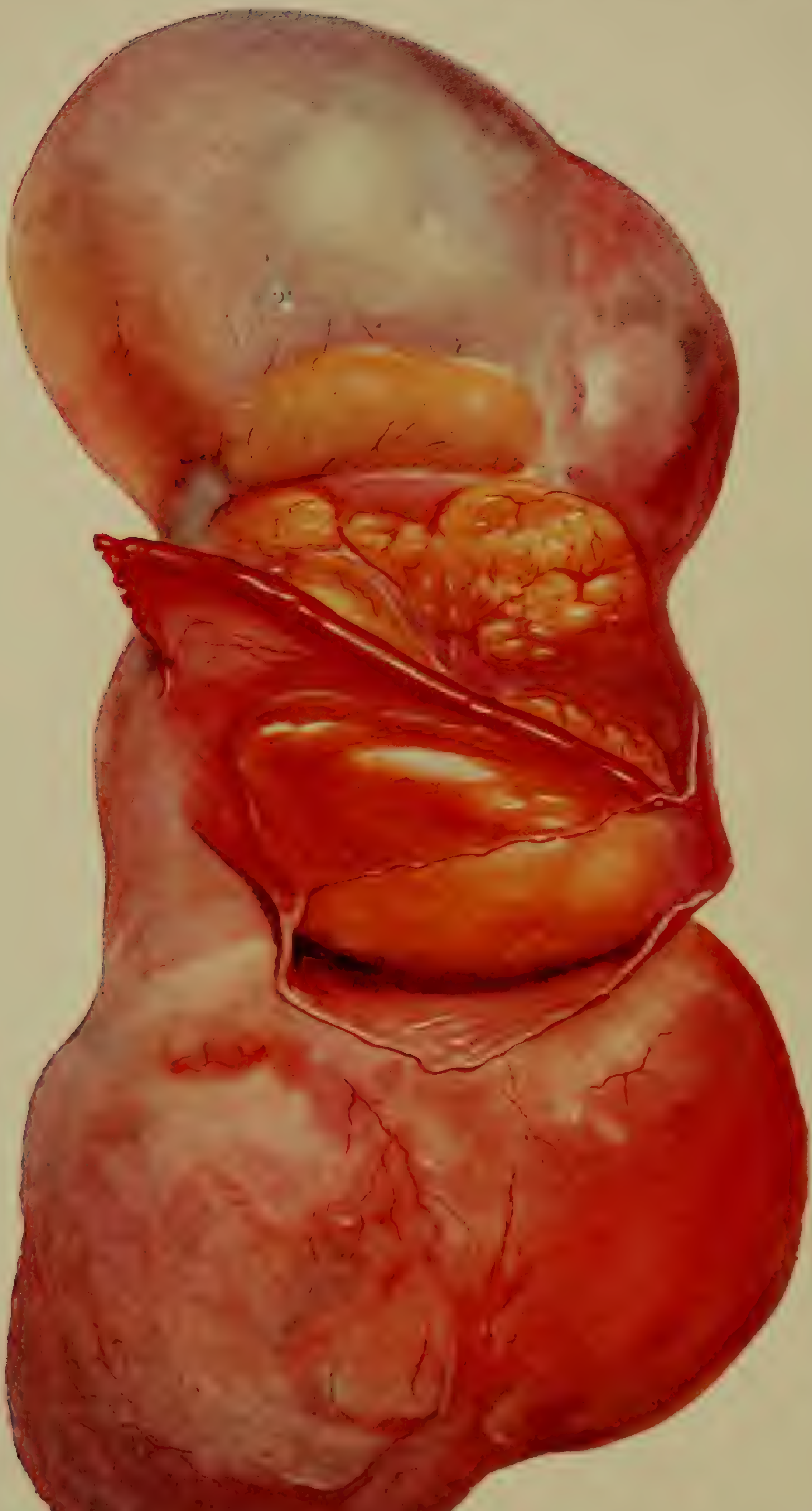
(3) Typical long fibres of involuntary muscle. These are relatively scanty, the majority lie in and about the walls of large venous spaces. There are many well-formed arteries and arterioles in the section.

Section B.—Near the centre is an area of dense stroma containing scattered bundles of unstriped muscle of ordinary appearance. In the remainder of the tissue the stroma is less dense and the muscle bundles are very numerous. Immediately around the denser area in the centre the bundles in a broad zone are cut transversely or approximately so. Externally to this they are for the most part cut longitudinally. The majority of the muscle fibres are typical striated fibres. Among them however are striated fibres with a central core of homogeneous cytoplasm containing a column of nuclei. Arteries and arterioles are numerous and normally developed. Several large veins of cavernous type with involuntary muscle forming a broad interrupted zone around their lumina are seen. Further, there are numerous, normally developed nerves.

Section C.—The tissue is similar to that described as the matrix in Section A, but is extremely rarefied, so as to bear a resemblance to a jelly tissue. No mucus is visible however, so that the rarefaction appears to be due to albuminous œdema. One surface is necrosed and infiltrated by neutrophil leucocytes. There are numerous engorged capillaries, and in the necrosed and subjacent purulent zones they are surrounded by red blood. There is no muscle in this section.

Characters of the Growth.

The neoplasm contains fibrous interstitial tissue, involuntary and voluntary muscle and nerves. It contains therefore mesoblastic and epiblastic derivatives. It is either a teratoblastoma, or possibly a teratoma in which the full potentiality of totipotent cells has not been exercised. The tissue of which it is composed, i.e., connective tissues, muscle and nerve, are tissues normally found in the site of origin. It is most probable, therefore, that it is a teratoblastoma and not an incomplete teratoma. The fibrous tissue is somewhat embryonic in



LOCKYER:
Lipoma of the Broad Ligament.

The mesosalpinx has been incised and partly reflected to show the tumour.

type. A great deal of the voluntary muscle is certainly embryonic, having a homogeneous core containing numerous nuclei, whilst contractile fibrils are confined to the periphery.[1]

Atypical nuclei such as are seen in malignant neoplasms are not present. The nerves are normal in structure. The tissue is supplied with normally formed blood-vessels amongst which are veins such as are found in cavernous tissue. The growth, therefore, appears to be a teratoblastoma displaying certain embryonic features, but does not appear to be obviously malignant.

I have to thank Dr. Hubert Turnbull, of the London Hospital Pathological Institute for his kind assistance in preparing the Pathological Report.

Lipoma of the Broad Ligament.

By CUTHBERT LOCKYER, M.D.

DURING the removal of an ovarian dermoid cyst from a single woman, aged 31, in January of this year, I noticed that the corresponding mesosalpinx was distended with fat and that the latter had spread itself out on the adjacent cyst-wall. The ovarian cyst after removal was found to be made up of two loculi, one of which contained dermoid grease and hair, whilst the other was filled with clear straw-coloured fluid.

In order to ascertain the relation of the fatty tissue to the dermoid cyst I opened up the mesosalpinx and found it possible to run my finger round an encapsuled fatty lobe and to separate it easily from the cyst-wall. The Fallopian tube was stretched out over this lobule of fat but was not adherent to it. The main bulk of the fatty tissue was therefore formed by a definitely encapsuled oval lobe with its long axis running parallel to the Fallopian tube. The round ligament was not removed and its relation to the fatty lobule was not noted. The base of the mesosalpinx was spread out on the ovarian cyst, and here the fatty tissue had been compressed between the peritoneum and the cyst-wall. As a result of this the simple loculus (not the dermoid loculus) was, in part, covered with fat. Compression of the lipoma had, in fact, caused a fatty infiltration of the surface-tissues of the ovarian cyst. The coloured drawing shown herewith (*see* Plate) illustrates the following points very clearly :—

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[1] *Vide* fig. 293B (fœtus of two months), in Schafer, "Text-book of Microscopic Anatomy," Lond., 1912, p. 193.

(1) The discrete fatty lobule in the mesosalpinx is easily separable from the cystic teratoma (dermoid).

(2) The cystic teratoma is intact, no dermoid grease has escaped.

(3) The fatty lobule is of a deep orange colour, contrasting strongly with the pale granular dermoid grease.

(4) The simple ovarian loculus, at its attachment to the mesosalpinx, is covered with fatty tissue which has been squeezed out and flattened by compression during the growth of the cyst. There was no fatty-infiltration on the wall of the adjacent dermoid loculus.

The conclusion drawn from these observations is that the fat in the mesosalpinx represents a true benign neoplasm—a lipoma—and that it is not merely an excessive subserous deposit of fat such as may be seen in some cases of malignant disease, still less is it the result of a transudation of dermoid grease from the adjacent intact cystic teratoma.

Examples of true lipoma of the broad ligament are rare. The scanty supply of fat in this retroperitoneal situation affords an easy explanation of this fact. I have found nine records which have a bearing upon the present publication. Seven of these are descriptions of true lipomas. The remaining two are records of dermoid cysts with distension of the mesosalpinx by some form of fatty material.

A short résumé of these cases is as follows :—

(1) "Symmetrical Lipomata of the Broad Ligaments:" Emrys-Roberts [1]. The author examined a specimen consisting of an ovarian fibroma and a uterus containing multiple fibroids. He discovered a small lipoma in each broad ligament. The one on the right side lay "at the posterior aspect of the fimbriated end of the tube." It was the size of a broad bean and in shape was a flattened ovoid. On section it presented the characters of a fatty tumour. The lipoma on the left side was about the same size as that on the right. It contained two minute cysts lined by columnar epithelium, which suggested that they arose from Kobelt's tubules.

(2 and 3) "Ein Fall von Lipoma des Lig. latum:" Borrmann [2]. This case is also described by Friese [3] in a "Dissertation" published in Berlin, 1907. The tumour was removed from a woman, aged 59. It had caused no symptoms. It lay on the right side between the layers of the broad ligament and measured 7½ cm. by 6½ cm. by 4 cm. It consisted of two lobes. The round ligament, which was well developed in its upper part, dwindled away as it reached the summit of the lipoma. The author mentions an example of broad ligament lipoma published by Middleschultze [4], in which the tumour was large,

weighing 15 kg., and measuring 88 cm. by 90 cm. In this case also the round ligament, after running obliquely across the tumour for a distance of 18 cm., gradually dwindled away. Borrmann suggests an inter-relationship between the "arrest of development" of the round ligament and the formation of lipoma in these two cases.

(4) "Subperitoneal Lipomata:" John Campbell [5]. This author published two cases. The first was a large adherent retroperitoneal lipoma of the abdomen; it was probably malignant and it does not come into this category. The second case was that of a lipoma of the right broad ligament and of the iliac fossa. It displaced the uterus to the left and was easily shelled out. The patient was aged 50, her nutrition was good, and she had suffered no pain.

(5) "A Case of Lipoma of the Broad Ligament:" Frederick Treves [6]. The patient was aged 32, tall, pale and very thin. She was admitted for pain in the back which lasted a fortnight and had compelled her to lie in bed. She had known of an abdominal tumour for many years. The tumour occupied the right side of the abdomen, it was the size of an adult head and reached to the umbilicus. It had all the characters of an ovarian tumour; there was no lobulation, it was tense, elastic, semi-solid and movable. It could not be reached on vaginal examination. The uterus moved with the tumour. There was no ascites. Malignancy was suggested. At operation, the right ovary and Fallopian tube were stretched out over the growth. The latter was fairly well encapsuled and did not encroach upon the retroperitoneal tissue about the wall of the pelvis.

The weight of the tumour was 72 oz. It measured 26½ in. by 21 in. and is preserved in the London Hospital Museum. The patient made a good recovery from operation.

(6) Parona [7]: "Caso di lipoma all'ovaia ed ovidotto de destra," quoted by Bland-Sutton and by Treves. Treves' quotation states that the broad-ligament lipoma was the size of a pear. The Fallopian tube was embedded in the growth so that only the fimbriated extremity was visible. "From this tumour, which Parona assumes had developed from one of the fimbriæ, a normal ovary was pendant" (Treves).

(7) Peyrot [8]: Also quoted by Treves, who says that a distinct account of a lipoma of the broad ligament is given by Peyrot. It was kidney shaped and about the size of a fist. It was quite movable. Treves remarks (1893) that this was the only case he had found which was described under the heading of a "Lipoma of the Broad Ligament."

(8) "Dermoid Ovarian Cyst; Infiltration of Broad Ligament with Fat" (card specimen). By Alban Doran for Sir T. Spencer Wells [9]. "The tumour (right ovary) consists of two cavities. One contained much greasy ovarian fluid. The other is still full of hair, grease and spicules of bone. A considerable amount of dense granular fat lies between the layers of the broad ligament. The left ovary is converted into a cyst 3 in. long, loaded with a greasy material. The fatty deposit in the broad ligament resembles the accumulation of fat sometimes seen near the rectum in rectal cancer. It was observed in the case of recurrence after primary cancer of the Fallopian tube, described by the exhibitor in the *Transactions of the Pathological Society*, vol. xl." Doran more than once drew attention to the excessive deposit of subserous fat in malignant pelvic disease.

(9) "Ovarian Dermoid; Infiltration of Broad Ligament with Fat." By John Bland-Sutton [10]. "The tumour was removed by the late Knowsley Thornton and consisted of an ovarian dermoid the size of a melon. The peculiarity of the specimen consisted in the circumstance that the mesosalpinx and adjacent parts of the broad ligament were infiltrated with rich granular fat. On investigation it was discovered that the cyst-wall had ruptured and "the tissues of the tumour, especially the fat, had burrowed along the lines of least resistance and made their way between the layers of the mesosalpinx and surrounded the tube."

I have already given what I consider to be conclusive reasons for regarding my specimen as a true lipoma, but have here included the cases of Doran and Bland-Sutton as being like my own so far as the presence of an ovarian dermoid and a fatty mesosalpinx goes—but here the similarity ceases.

I have no opinion to express regarding the ætiology of lipoma of the broad ligament and the speculations of other writers are not very helpful. Borrmann suggests that local developmental anomalies may have a causal relationship. Doran hints at "some teratological element" being concerned. Adami [11] notes that retroperitoneal lipomata are more common in women than in men (in the proportion of 25—16), and that the right side is a commoner site than the left. According to this author the most frequent situations for retroperitoneal lipomata are the region of the kidney and the iliac fossa.

Doran [12] draws a sharp distinction, from a surgical point of view, between prevertebral lipomas and those of the broad ligament and of the omentum. The former are often very adherent and many of them are sarcomatous, they yield a very heavy mortality where operation is attempted; whereas lipomata of the broad ligament and of the omentum are benign, non-adherent, therefore easily removed, and the prognosis is good.

REFERENCES.

[1] Emrys-Roberts. *Lancet*, 1909, ii, p. 186.

[2] Borrmann. "Ein Fall von Lipoma des Lig. latum," *Virchow's Archiv f. Path. Anat. und Phys.*, 1907, clxxxix, p. 431.

[3] Friese. Dissertation, Berlin, 1907.

[4] Middleschultze. Dissertation, Greifswald, 1884.

[5] John Campbell. "Subperitoneal Lipomata," *Brit. Med. Journ.*, 1903, ii, p. 1397.

[6] Frederick Treves. "A Case of Lipoma of the Broad Ligament," *Trans. Clin. Soc.*, 1893, xxvi, pp. 101-104.

[7] Parona. *Ann. di Ostet. Milano*, 1891, xiii, 103-105, plate 1.

[8] Peyrot. *Bull. Soc. Anat.*, Paris, 1875, p. 178.

[9] Alban Doran for Sir T. Spencer Wells. "Dermoid Ovarian Cyst," *Trans. Path. Soc. Lond.*, 1890, xli, p. 202.

[10] John Bland-Sutton. "Ovarian Dermoid, &c.," *Trans. Obst. Soc. Lond.*, 1892, p. 7.

[11] Adami. *Montreal Med. Journ.*, January-February, 1897.

[12] Doran. *Journ. Obst. and Gynæcol. of Brit. Emp.*, 1902, ii, p. 244.

Dr. **AMAND ROUTH**: There are almost as many of these retroperitoneal lipomata in men as in women so that many of the ætiological explanations given will not apply.

Severe Retro-peritoneal Bleeding after Dilatation of the Cervix.

By H. R. Andrews, M.D.

A patient, aged 37, consulted me on February 4 on account of excessive bleeding at the periods. She had had two children, eleven years ago and nine years ago respectively, and no miscarriages. She had had menorrhagia for a year, the bleeding lasting from eight to ten days, with floodings on the second day. She was distinctly anæmic. She had complained for a month or two of what she called "sciatica in the wrong place"—i.e., pain chiefly on the outer side of the right thigh and hip. She had been through a great deal of nervous strain and was rather worn out. Abdominal examination revealed nothing abnormal. The cervix was healthy; bimanually the body of the uterus was enlarged to the size of a six weeks' pregnancy. I thought that it contained a submucous fibroid and advised dilatation, exploration of the interior of the uterus, and enucleation of the fibroid if one was found. Her sister some years ago had had this operation performed, and later, abdominal hysterectomy had been necessary. My patient was anxious if possible to avoid hysterectomy and asked me not to proceed any further if I found that a submucous fibroid could not be enucleated from below.

On February 10 I dilated the cervix up to No. 18 Hegar and found a submucous fibroid situated posteriorly and to the left. I removed four small fibroids, which were aggregated into a mass the size of an ordinary grape, and four separate ones about the size of peas. I could feel at least two small fibroids situated deeply in the posterior wall, but found it impossible to enucleate them. There was a small tear in the right side of the cervix at about the level of the internal os, but nothing that gave me a moment's uneasiness. That evening the patient complained of some pain in the right thigh. After I had seen her she had a good deal of pain which was relieved by the passage of urine. On the morning of the 11th she was complaining of pain, in the outer part of the right thigh and in Hunter's triangle, which, she assured me, had nothing to do with the operation. After a small gauze plug had been removed from the vagina there was no bleeding. There was no tenderness in the abdomen. I was not quite happy about her and rather suspected a hæmatoma in the broad ligament, although at that time I did not know that such a thing had been known to follow a dilatation of the cervix. At 6 p.m. she looked ill and had a great deal of pain, chiefly in the right groin, none in the abdomen. There was no swelling to be felt in the iliac fossa; there was no external bleeding. The pulse-rate was 86, so I thought that if there was a hæmatoma it must be quite a small one. On the morning of the 12th she was still looking ill. She had had a very bad night with much pain. On vaginal examination there was no bleeding and nothing abnormal could be felt, but there was a very tender swelling to be felt in the right iliac fossa. The pulse rate was 90. I saw her again a couple of hours later and decided that I must open the abdomen. I arranged for this to be done at 2 o'clock, and, as I knew that I might be in for a very unpleasant operation, I got Sir Hugh Rigby to promise to assist me. I went into the Home at 12.30 to tell them of the arrangements that I had made and found that the sister had just telephoned to me to tell me that the patient had collapsed. I found her evidently suffering from severe loss of blood, blanched, with a pulse-rate of 120. I thought it probable that the peritoneum had given way and that bleeding had occurred into the abdominal cavity. On opening the abdomen there was no free blood, but there was a huge retroperitoneal hæmatoma reaching up so as to surround the kidney and bulging forward almost into the middle line. It is very little exaggeration to say that the greater part of the right half of the abdominal cavity was obliterated. The upper part of the right broad ligament was considerably distended; the lower part not nearly so much. I incised the peritoneum and let out an enormous quantity of blood, chiefly fluid or very recent clot, and then proceeded to do a subtotal hysterectomy as rapidly as possible. The patient's pulse was so feeble and the tissues were so infiltrated with blood that it was impossible to identify the uterine artery. I tied a ligature in the situation where the uterine artery ought to be, at the level of the internal os. I pulled up this ligature, transfixed the tissues just external to the cervix at a lower level and tied outside the first ligature, and then repeated this again, as I was anxious to make certain of getting control of the uterine artery and its branches without endangering the ureter. Exposure of the ureter by a dissection would have been a slow and difficult business, and rapidity in operating was essential. After clearing out as much blood as possible from the retroperitoneal space, I inserted a rubber drainage-tube into this space, closed the rest of the hole in the peritoneum through which my hand had passed and closed the abdomen, bringing out the tube through the middle of the abdominal incision. During the operation a pint and a half of saline solution were inserted under the left breast. She was put back to bed with a pulse of 140. The foot of the bed was raised about a couple of feet and she was given saline solution *per rectum*, three pints in all, in the next eight hours. I saw her every hour. She was holding her own, with a pulse-rate of 136 until about 9.30 p.m., when the pulse became distinctly more empty and the rate more rapid. There was no restlessness nor air-hunger, and she was conscious and sensible, but I felt that she was losing ground. After consultation we decided on giving her some of her brother's blood. There was no time to find out to what group her blood belonged, and Mr. (now Sir) Cuthbert Wallace said that if we gave her brother's blood slowly we could do no harm if we stopped at once should she complain of pain in the back or abdomen. At 11.30 p.m., with the help of Sir Hugh Rigby and Dr. Western, we gave her 350 c.c. of her brother's blood, 10 or 20 c.c. at a time, with sodium citrate. The immediate result was excellent. The pulse-rate came down to 130, the artery was distinctly fuller and her colour improved. She was very ill for the next few days, the respiration-rate usually over 30, often as high as 36 to the minute, pulse-rate 126 to 130. The temperature was 99° to 102° F. On the 15th it went up to 103° F. She did not sleep at all except with injections of $\frac{1}{4}$ or $\frac{1}{3}$ gr. of morphia. There was a short dry cough which troubled her a good deal. There were no abnormal physical signs in the lungs except a few crepitations at the bases.

Her brother, her night-nurse, another nurse and three servants in the nursing home all developed influenza the day after the operation, and I have no doubt that she had influenza herself. The members of the depleted staff worked with unremitting care, and the ultimate recovery of the patient was due to their efforts. For the first four days after the operation I was extremely anxious about her. During the first thirty-six hours a good deal of bright red, rather watery, fluid came through the drainage tube, and I could not feel certain that I had completely stopped the bleeding. The symptoms of collapse six hours after the operation were probably due to oozing from the walls of the very extensive cavity. By the 18th, six days after the operation, the patient was distinctly better and began to look less anæmic. I removed the tube on the sixth day, and the wound healed perfectly. Sleeplessness remained a very troublesome symptom and the pulse was always rapid. For three or four weeks there was a mild degree of pyrexia.

The uterus showed only a very small tear at about the level of the internal os. This tear must have involved a branch of the uterine artery on the outer side of the cervix so that all the bleeding occurred outside the uterus. There was no perforation of the wall elsewhere. No blood came down the canal.

This case was my first experience of broad ligament hæmatoma apart from rupture of the uterus in labour, and I sincerely hope that it will be my last, as I have never had a case which gave me more acute and long-drawn-out anxiety. The absence of external bleeding, the absence of abnormal physical signs on vaginal examination, and the slowness of the pulse at first seemed to me to contra-indicate exploratory abdominal section, and I put this off until it was almost too late. The severe and dangerous bleeding occurred after I had decided to operate. I presume that the peritoneum at the level of the iliac crest resisted separation and limited the bleeding for a time; when separation occurred the bleeding was as free and uncontrolled as if it had been taking place into the peritoneal cavity. The infusion of blood in this case was my first experience of this treatment for secondary anæmia. The results were most striking and successful.

DISCUSSION.

Dr. F. J. McCann: The case serves to emphasize the dangers which may be associated with rapid dilatation of the cervical canal. The larger sized dilators do not dilate the canal, they tear it. This can be easily proved by introducing the little finger into the cervical canal after the dilator is withdrawn. Where a wide expansion of the canal is required it is much better to reflect up the bladder and to incise the cervix and lower part of the uterus in the middle line. Thus there is one clean cut, which is subsequently sutured, instead of several tears. Even with the smaller sized dilators where resistance to their passage is encountered, it is a good plan to pass a long thin knife into the cervical canal and to cut (from within) the anterior and posterior cervical wall for a sufficient depth in the middle avascular line. A larger sized dilator can then be passed with ease. This procedure is comparable to the operation of internal urethrotomy as practised on the male urethra. Moreover the operation of dilatation of the cervical canal should be done very slowly in order to avoid tearing. It is for this reason amongst others that a tent is such an efficient dilator, although objections may be urged against its use on other grounds. I believe much more harm results especially from the use of large dilators than is generally admitted.

Dr. Fairbairn: Surely Dr. McCann has greatly exaggerated the risks of metal dilators. I will agree that laceration is frequent, in fact almost the rule, with the larger sized dilators, but what proof has he to offer that a split of the cervix is any more dangerous than a cut by a knife? The chief danger in both is sepsis, and he has yet to show that there is any greater danger in the one case than in the other. As to hæmorrhage, the case recorded by Dr. Andrews is very unusual and the explanation not obvious. I should be glad to hear if any members of this Section have met with cases of severe bleeding as the result of dilatation; so far from thinking that more harm results than is generally admitted, I must have split the cervix in numberless cases and so far I have not known of any immediate or remote disaster. I would rather say that a cervical tear has been given a bad name without just reason, but I shall be quite prepared to acknowledge its terrors if the evidence is forthcoming. My own idea is that splitting and tearing cause less bleeding than cutting and that muscular retraction plays an important part in checking bleeding.

Dr. Eden: I have seen one case of severe hæmorrhage from a laceration of the cervix produced during dilatation with metal dilators. It occurred at the Louise Margaret Hospital at Aldershot; the officer in charge of the hospital had dilated without difficulty for an exploratory curetting, the vagina being lightly plugged afterwards. When the plugging was taken out a severe hæmorrhage occurred which was controlled by plugging the cervix. When this plugging was removed the bleeding recurred and this happened twice. I then saw the case myself, and examining under anæsthesia I found a laceration at the level of the internal os which opened up the right broad ligament. The broad ligament cavity and cervix were plugged for 48 hours and no further hæmorrhage occurred. This differed from Dr. Andrews' case in the hæmorrhage being external and the lesion very easily dealt with. A possible explanation of Dr. Andrews' case is that a varicose vein in the broad ligament was ruptured at a point some distance from the cervical wall. If the bleeding had been from the uterine artery it must have been quite close to the torn cervical wall, and the blood would have escaped into the vagina.

Dr. AMAND ROUTH: It is dangerous to use vaseline when dilating, for though dilatation is easier to secure, it is more difficult to avoid laceration. For facilitating dilatation I have found that the insertion by the nurse of a glycerine wool tampon or pessary encourages physiological secretion from the cervix, with accompanying relaxation of the tissues, as seen in the first stage of labour.

Dr. ANDREWS (in reply): If I have to enucleate a submucous fibroid larger than a walnut I almost always cut through the cervix and lower part of the body of the uterus so as to get plenty of room. I have not dared to suggest that there was an abnormal vessel in the broad ligament in this case, although the suggestion was made by someone else during the operation, as there was a large thin-walled vein seen in the upper part of the left broad ligament.

The Syphilitic Placenta.

By EARDLEY HOLLAND, M.D.

DURING the course of an investigation into the causes of fœtal death, I have had opportunity to examine a large number of placentas. Included in these is a series of placentas belonging to syphilitic fœtuses. All modern text-books describe certain changes in the placenta in cases of fœtal syphilis. Although I can present nothing new in the way of histological or other changes, yet I have thought that members of this Section would be interested to know the results of the examination of a series of syphilitic placentas. The individual changes are known to all, yet most of us are without precise information as to how often these changes are found in the placenta, and to what extent they are pathognomonic of syphilis. In other words, it is necessary to have some idea of the diagnostic worth of these changes; for we may sometimes wish to use the placenta as a means of diagnosing fœtal syphilis, when other means, such as the presence of spirochætes in the fœtal organs, or fœtal chondro-epiphysitis, are not available.

The changes commonly described in the syphilitic placenta may be divided into three: (1) Naked-eye appearances, (2) the ratio of the weight of the placenta to the weight of the fœtus, and (3) the histological changes.

(I) NAKED-EYE APPEARANCES.

I defy anyone to proclaim a placenta syphilitic from the most careful naked-eye examination. In my experience there are no particular naked-eye changes in syphilitic placentas, nothing to distinguish them from many other placentas. I feel it important to emphasize this because even nowadays there is a good deal of loose talk about the appearance of the syphilitic placenta. One hears or reads such statements as: "The placenta was, from its appearance, obviously syphilitic." The appearances which are wrongly supposed to denote syphilis are voluminous cotyledons, deep sulci, pale placental tissue, grey and greasy maternal surface, unusual softness and friability. Some of these appearances may occasionally be seen in syphilitic placentas, but they are just as commonly found in other conditions.

(II) WEIGHT-RATIO OF THE PLACENTA.

In my experience far too much importance has been attached to the increased weight of the syphilitic placenta. It is true that, if the mean of a number of cases be taken, the mean ratio for syphilis is less than the mean ratio for non-syphilitic cases. But such increased weight is by no means constant nor is it peculiar to syphilis. This is well shown in the following tables. I should state that all the ratios have been worked out from cases of fœtal death, so that the mean ratios for the non-syphilitic cases probably do not represent the mean ratio for the normal placenta and fœtus. The placentas were weighed after the amnion, chorion and umbilical cord had been removed.

Table I shows the mean ratios for fresh and macerated non-syphilitic fœtuses respectively: (*a*) The mean for all fœtuses, (*b*) the means when the fœtuses are divided into three weight groups. The mean for fresh and macerated fœtuses is much the same. The weight grouping shows that the ratio becomes progressively higher as the weight of the fœtus increases; that is to say, the placenta is relatively heavy in premature fœtuses. This is an important point to remember when considering the heaviness of the syphilitic placenta, for syphilitic fœtuses are nearly all premature.

TABLE I.

FRESH NON-SYPHILITIC.		MACERATED NON-SYPHILITIC.	
Number of Fœtuses	94	Number of Fœtuses	64
Mean ratio	8 (7·6)	Mean ratio	8 (7·9)

Fresh.

	Under 1,800 grm.	1,800 to 3,000 grm.	Over 3,000 grm.
Number of fœtuses	20	36	38
Mean ratio	6	8	8

Macerated.

Number of fœtuses	18	33	13
Mean ratio	6	8	10

TABLE II.—SYPHILITIC.

Number of fœtuses	34
Mean ratio	6 (5·6)

	Under 1,800 grm.	1,800 to 3,000 grm.
Number of fœtuses	19	15
Mean ratio	5 (4·6)	7 (6·8)

TABLE III.—ALL TOGETHER.

	Number	Mean ratio for all	Under 1,800 grm.	1,800 to 3,000 grm.	Over 3,000 grm.
Fresh non-syphilitic	94	8	6	8	8
Macerated non-syphilitic	64	8	6	8	10
Syphilitic	34	6	5	7	—

TABLE IV.—RATIOS ARRANGED IN TABLES SHOWING FREQUENCY-DISTRIBUTION AMONGST FŒTUSES OF DIFFERENT WEIGHTS.

Fresh Non-syphilitic.

Grm.	2	3	4	5	6	7	8	9	10	11	12	
600 to 1,800	2	0	2	8	3	2	2	0	1	0	0	= 20
1,800 to 3,000	0	0	0	2	5	7	6	11	4	1	0	= 36
Over 3,000	0	0	0	1	4	11	6	9	2	4	1	= 38
	2	0	2	11	12	20	14	20	7	5	1	= 94

Macerated Non-syphilitic.

Grm.	2	3	4	5	6	7	8	9	10	11	12	
600 to 1,800	0	1	5	2	1	4	1	2	2	0	0	= 18
1,800 to 3,000	0	1	2	4	2	7	4	8	0	2	3	= 33
Over 3,000	0	0	0	0	0	1	2	4	0	3	3	= 13
	0	2	7	6	3	12	7	14	2	5	6	= 64

Syphilitic.

Grm.	2	3	4	5	6	7	8	9	10	11	12	
600 to 1,800	0	7	3	3	3	3	0	0	0	0	0	= 19
1,800 to 3,000	0	2	1	4	1	1	3	0	2	1	0	= 15
	0	9	4	7	4	4	3	0	2	1	0	= 34

Table V.—Placentas of 26 Spirochæte-positive Fœtuses.

Typical of syphilis in...	16, or 61 per cent.
Suspicious in	6, or 23 ,,
Negative in ..	4, or 15 ,,

Placentas of 91 Spirochæte-negative Fœtuses.

54 Macerated Fœtuses.		*37 Fresh Fœtuses.*	
Typical ...	5	Typical ...	0
Suspicious	6	Suspicious	4
Normal ...	43	Normal ..	33

Summary as regards Agreement of Sections with Diagnosis of Syphilis.

117 Placentas.

Typical, 21	undoubted fœtal syphilis in 19 (90 per cent.)
Suspicious, 16	,, ,, ,, 6 (38 ,,)
Normal, 80	,, ,, ,, 4 —

Table II shows the mean ratios for cases of fœtal syphilis: (*a*) The means for all fœtuses, (*b*) the mean when the fœtuses are divided into weight groups.

In Table III are displayed all together the ratios for fresh and macerated non-syphilitic, and for syphilitic, fœtuses, both for total fœtuses and for fœtuses divided into weight groups.

Examination of these tables shows that there is not a very great difference between the ratios of syphilitic and non-syphilitic fœtuses. The real test of the worth of heaviness of the placenta as a sign of syphilis is best got by arranging the ratios in tables showing their frequency-distribution amongst fœtuses of different weights. I have done this in Table IV. Two facts emerge which show that heaviness of the placenta is not a sign of great worth in diagnosing syphilis: (1) Amongst the non-syphilitic placentas, a fair number are heavy, their ratios being equal to or less than the mean ratio for the syphilitic placentas. (2) Amongst the syphilitic placentas, a fair percentage are not heavy, their ratios being equal to or greater than the mean ratio for the non-syphilitic placentas.

I will now consider the exceptionally heavy non-syphilitic placentas, selecting only those whose weight is far above the average—those with a ratio of under 3·6 for fœtuses of less than 1,800 grm., with a ratio of less than 5·6 for fœtuses of from 1,800 to 3,000 grm., and with a ratio of less than 6·6 for fœtuses of over 3,000 grm. in weight.

Under 1,800 grm.

(1) Ratio 2·6. Case of eclampsia. Placenta has interstitial hæmorrhages and red infarcts.

(2) Ratio 1·8. Case of general œdema of the fœtus. Many former dead fœtuses. Villi enlarged and avascular, resembling the syphilitic placenta histologically, but villi lower and more irregular.

(3) Ratio 3·3. Accidental hæmorrhage, macerated fœtus, placenta contained an interstitial hæmorrhage and red infarcts.

1,800 to 3,000 grm.

(1) Ratio 5·2. Case of placenta prævia.

(2) Ratio 3·2. Macerated fœtus, Wassermann positive, possibly syphilis.

(3) Ratio 3·8. Macerated fœtus. Case of albuminuria of pregnancy. Placenta weighed 700 grm., and was the largest in my series, contained two interstitial hæmorrhages.

(4) Ratio 4·3. Case of accidental hæmorrhage. The villi are large and resemble exactly those of syphilis.

(5) Ratio 5·5. Clot, probably ante-mortem, in umbilical vein, otherwise nothing to account for death.

(6) Ratio 5·5. Case of accidental hæmorrhage. Many white infarcts and some red.

(7) Ratio 5. Possibly syphilis. Wassermann positive, spleen enlarged, otherwise no signs of syphilis. Villi normal.

(8) Ratio 5·4. Cause of death unknown. The patient had possibly had syphilis. Villi normal.

Over 3,000 grm.

(1) Ratio 5·5. General œdema of fœtus. Villi large, dense and irregular.

(2) Ratio 5·9. Albuminuria of pregnancy.

(3) Ratio 6·3. Case of forceps delivery. Cerebral hæmorrhage.

(4) Ratio 5·8. Case of breech labour. Cerebral hæmorrhage.

Summary of these Fifteen Cases, which are very extreme.

(1) Two cases of possible syphilis. Maternal Wassermann reaction positive and fœtal spleen enlarged, but no spirochætes and no chondro-epiphysitis. Villi normal. One case in which the mother gave a

history of previous syphilis, but no signs of syphilis in mother or fœtus.

(2) Six cases of toxæmia of pregnancy, comprising two of albuminuria of pregnancy, one of eclampsia, and three of accidental hæmorrhage. In most of these the placenta showed red infarcts, and some had interstitial hæmorrhages.

(3) Two cases of general œdema of the fœtus.

(4) One case of placenta prævia.

(5) Two cases of difficult labour, with fœtal cerebral hæmorrhage, and one case in which the cause of death was unknown.

Taking now the syphilitic placentas, which are not especially heavy, we see from the Table that there are six of under 1,800 grm. with a ratio of 6 or more, and six of over 1,800 grm. with a ratio of 8 or more. That is, out of thirty-four syphilitic placentas, twenty-two, or 65 per cent., were heavier than normal. Heaviness of the syphilitic placenta is not constant, therefore, and is not of great value as a diagnostic sign.

(III) HISTOLOGY OF THE SYPHILITIC PLACENTA.

Of the thirty-seven fœtuses whose tissues contained spirochætes the placentas were examined microscopically in twenty-six. The histological points which have been noted as characteristic of syphilis, but which were not found in all of these twenty-six placentas, are :—

(1) A uniform increase in the size of the villi, resulting in their being more crowded together than normally and implying a corresponding reduction in the size of the intervillous spaces. This change is due to an increase in the amount and density of the stroma, the collagen fibres being more numerous and the cells more abundant and closely packed.

(2) A greatly diminished vascularity of the villi. The blood-vessels are usually absent: when present they are greatly diminished in number and size. The walls of the vessels, when present, are not altered : they still appear as fine endothelial-lined channels in the stroma.

These changes (fig. 2) sometimes affect the whole placenta uniformly, and sometimes only partially. The villi coming from one or more main chorionic stems may be affected, whilst others escape, healthy and changed villi being seen side by side in the same section. It is obviously absurd to diagnose syphilis from the discovery in a section of a few isolated large, dense, avascular villi. Furthermore, it is obvious that little help may be got from one section : either one very large section or several small ones must be used.

So far as my observations have gone I have not found special changes in the blood-vessels of the placenta. It is commonly stated that the vessels of the villi in syphilis are obliterated by an endarteritis. I have never observed this. What vessels there are reveal themselves as little circular collections of endothelial cells, their walls are not increased in thickness nor have the endothelial cells multiplied.

The explanation of the avascularity of the villi in syphilis, I believe, is that the terminal villi have never been properly vascularized by the downgrowth of blood-vessels, and not that the villi have become devascularized by a later obliteration of the vessels.

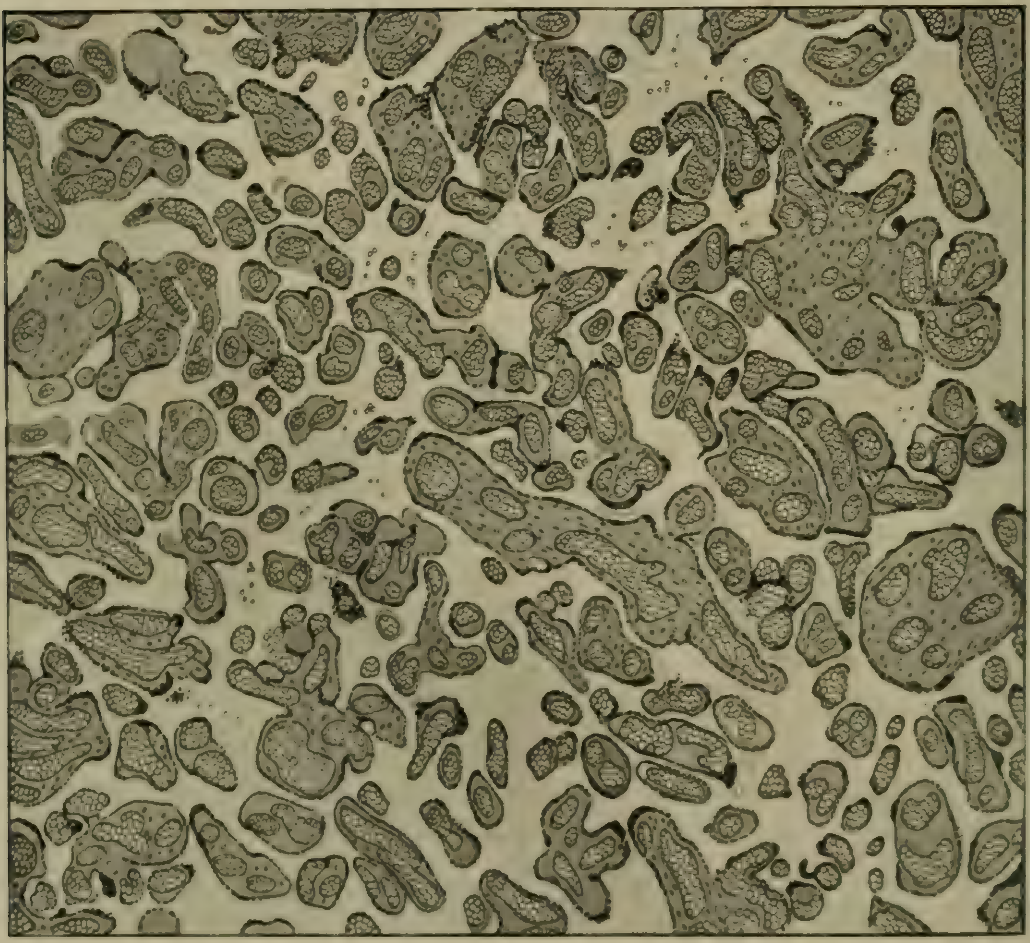

Fig. 1.

Normal placenta: for contrast with fig. 2.

I have one other point to mention—the occurrence of a small round-celled infiltration of the stroma of the villi, indicating an inflammatory change. In a few sections, at long intervals, I found places where neighbouring villi had coalesced and where the stroma was infiltrated with small round cells. These appearances were exceptional and must await further observation.

In five sections I found a little node composed of leucocytes, three times lying in the thick chorionic membrane and twice in the decidua. They all occurred in syphilitic placentas. If these were tiny gummata, they would be of material aid in diagnosing placental syphilis (figs. 3, 4).

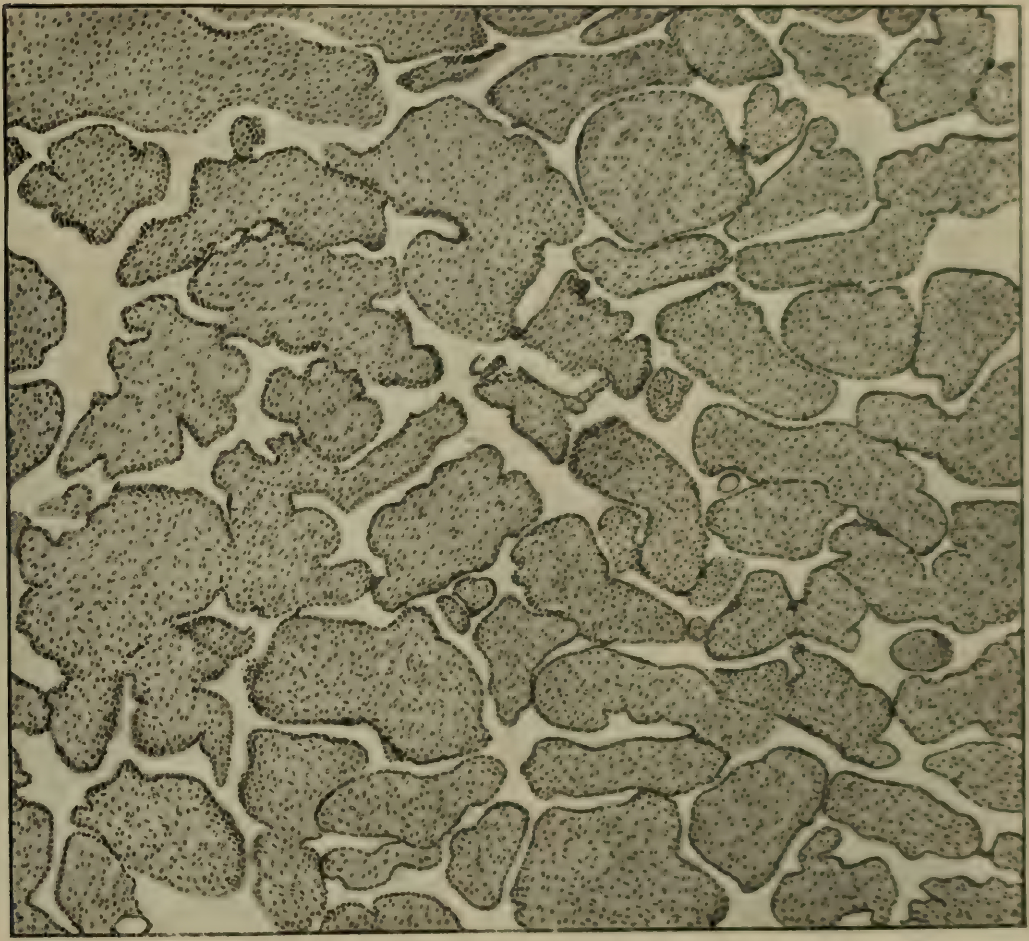

FIG. 2.

Syphilitic placenta.

According to the completeness with which these changes were found in the twenty-six syphilitic placentas I have examined, the placentas were grouped into three classes: (1) Typical, (2) suspicious, (3) negative or normal. When the changes are perfectly developed and uniformly distributed they are easily recognizable. But where the distribution of enlarged villi is patchy, or where the blood-vessels are only moderately diminished, the diagnosis is extremely difficult and it is only safe for those who are in the habit of regularly examining placental sections to give an opinion. For the changes do not consist in the formation of foreign tissue elements, or of rearranged structure; they are simply exaggerations of the normal, and it is sometimes difficult to decide between what is only a physiological abnormality and a really pathological change. The two are not separated by a sharp line. A series of control sections is of great assistance.

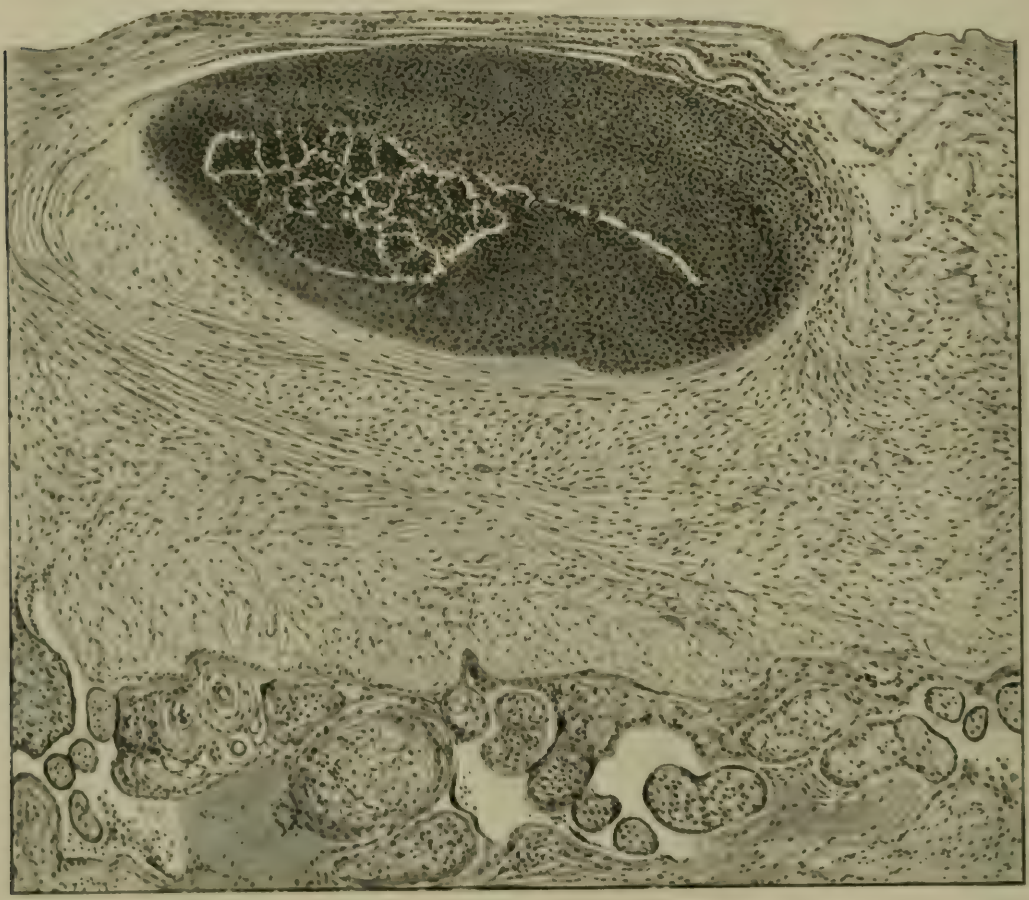

FIG. 3.

Small node of leucocytes, in chorionic membrane: probably a gumma.

Results are shown in Table V. In the same table are shown the results obtained from the examination of the placentas of ninety-one spirochæte-negative fœtuses. Taking now the latter, I will examine the details of the cases from which the "typical" or "suspicious" sections came. The results give strong support to the reliability of the placental histology for the diagnosis of syphilis.

There are five "typical" sections amongst the macerated spirochæte-negative fœtuses. Three of these prove to be undoubted cases of fœtal syphilis. All had maternal positive Wassermann reactions: two of the fœtuses showed chondro-epiphysitis. The third fœtus showed no chondro-epiphysitis, but I had the mother under treatment before pregnancy, during which time the Wassermann reaction became negative. The two remaining cases showed no evidence whatever of syphilis: one was a case of accidental hæmorrhage and albuminuria; in the other the cause of fœtal death was undetermined. The results obtained from "typical" sections can be thus summarized. In the microscopical examination of 117 placentas, twenty-one gave appearances typical for syphilis; of these twenty-one, nineteen were undoubted cases of syphilis, whilst in two there was no evidence of syphilis.

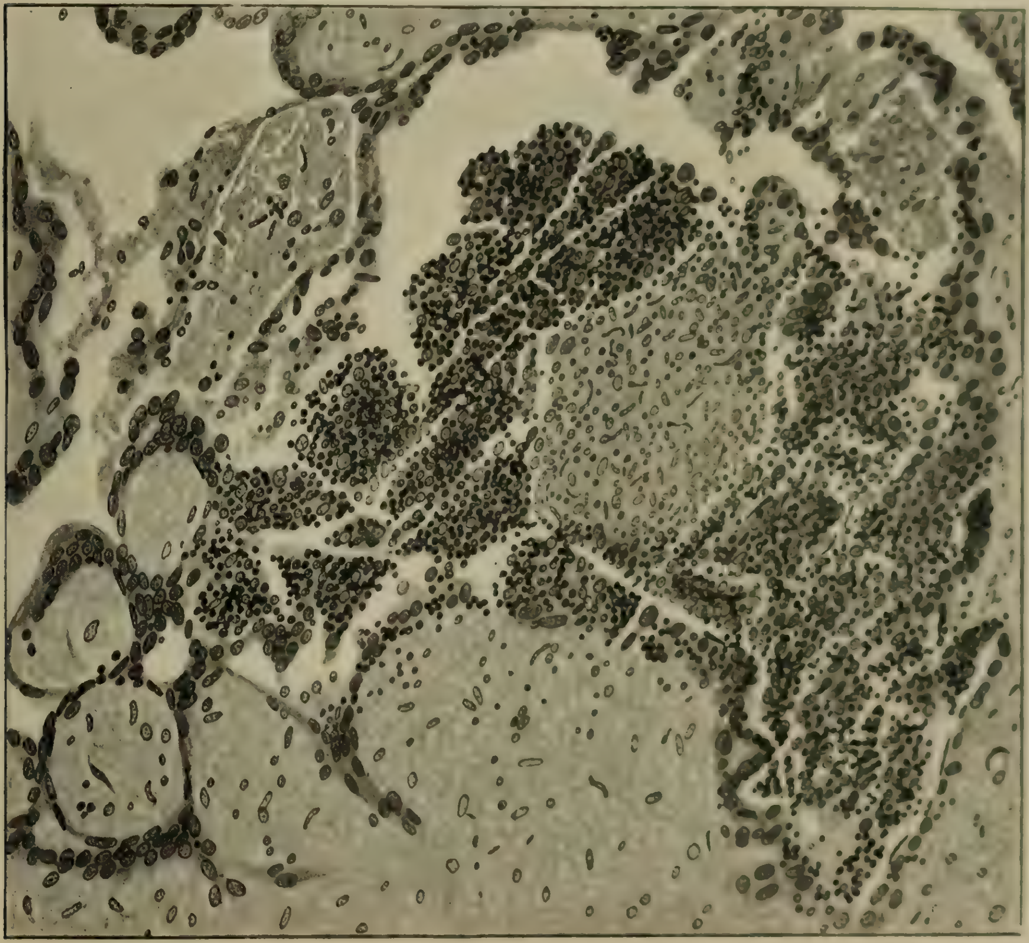

FIG. 4.

Small node of leucocytes, at the edge of the decidua: probably a gumma.

From this small series it can be stated that the diagnosis of syphilis from a typical section will be correct in 90 per cent. of cases. Thus, a typical section is highly reliable.

I will next consider the "suspicious" sections, amongst the spirochæte-negative fœtuses. In one the Wassermann reaction was positive in the mother: the fœtus was killed during a breech-labour by cerebral hæmorrhage: there was no other evidence of syphilis and the case has not been classed as such. Two were cases of general fœtal œdema. The interesting point comes out in the remaining seven—all were cases of toxæmia of pregnancy—accidental hæmorrhage or albuminuria of pregnancy, or both. The results forthcoming from "suspicious" sections can be thus summarized: In the microscopical examination of

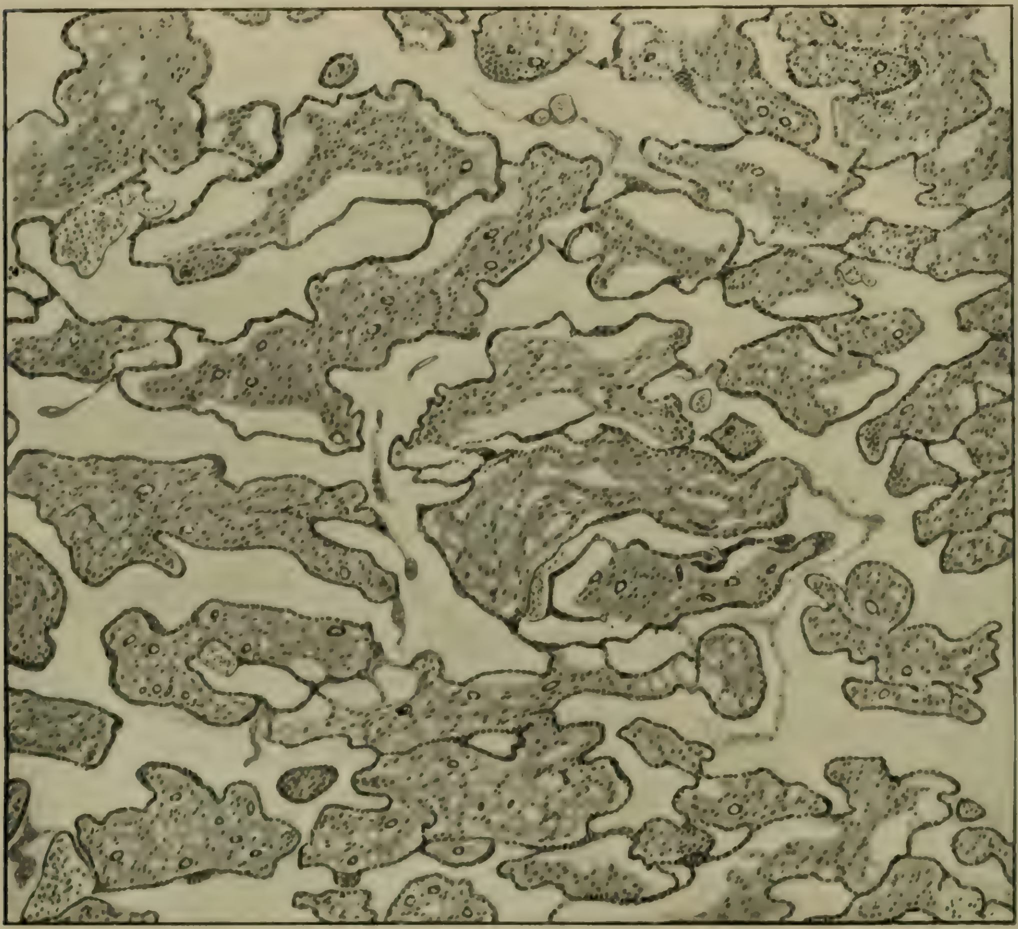

Fig. 5.

Section of placenta from a case of œdema of the fœtus: the villi are enlarged, but are not dense and avascular: the stroma is loose and œdematous. Contrast with fig. 2.

117 placentas, sixteen gave appearances "suspicious" of syphilis: of these sixteen, six are undoubted syphilis. From this small series it can be stated that the diagnosis will be correct in only 38 per cent. A merely suspicious section is unreliable.

DISCUSSION.

Dr. AMAND ROUTH: As relatively far fewer spirochætes are found in the placenta than in the tissues of the fœtus this is probably due, as I have elsewhere suggested, to the controlling and spirillolytic action of the chorionic ferments. Are the pathological changes in the placenta mainly intravillous (fœtal) or are they intervillous (maternal), and as the changes closely resemble those found in the placenta in cases of toxæmia, does Dr. Holland consider that the syphilitic changes are due to a specific toxæmia?

Dr. EARDLEY HOLLAND (in reply to Dr. Amand Routh): The changes were confined to the fœtal part of the placenta—i.e., to the connective tissue of the villi and the blood-vessels: I have not observed any changes in the decidua, beyond the very occasional presence of aggregations of small round cells, which might possibly be gummatous in nature. The changes might possibly be due to a specific toxæmia; I do not know of any evidence either for or against that view.

Section of Obstetrics and Gynæcology.

President—Mr. J. D. Malcolm, F.R.C.S.Ed.

Obstructed Labour due to Ventrifixation.[1]

By W. Gilliatt, M.S.

R. C., a primigravida, aged 32, was admitted to Queen Charlotte's Hospital under my care on October 24, 1918. The history given was that two years previously the patient had an operation for prolapse at the Hornsey Cottage Hospital. Labour began on October 19, five days before admission, and the membranes ruptured at the onset of labour. The pains were at first weak and irregular, but had been extremely violent on the day before admission, giving way to less violent continuous pain on the day of admission. On the night before admission, and again the following morning, the patient had profuse uterine hæmorrhage, for which her practitioner had to plug the vagina a few hours before admission.

When seen in hospital the patient's general condition was not good, her temperature was 100° F. and her pulse 112. Abdominal examination showed a median subumbilical scar about $3\frac{1}{2}$ in. long. The uterus was very tense and no relaxation occurred, it was asymmetrical, being more prominent to the right of the umbilicus, and extending into the right loin. Owing to the tense condition of the uterine wall no fœtal parts could be made out except the head, which was felt with difficulty in the right loin. The fœtal heart could not be heard. *Per vaginam* : After removal of an ineffectual plug of offensive gauze, an attempt was made to render the vagina as sterile as possible with brilliant green and methyl violet solution. The cervix was very high and could only just be reached, it was displaced backwards and to the right. The os was the size of a florin, and some part of the child could just be felt tightly impacted in it.

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[1] At a meeting of the Section, held July 3, 1919.

The condition seemed to me to be an early tonic contraction of the uterus, due probably to some trouble in connexion with the operation for prolapse, and at this time we were ignorant of the nature of the operation. Further, I regarded the patient as already gravely infected, and a very difficult decision had to be made as to how best to deliver her. The three following methods presented themselves :—

(1) *Per vaginam :* In order to ascertain if this were possible the patient was examined under anæsthesia. This revealed the impossibility of this route for delivery owing to the inaccessibility of the cervix, its size and rigidity. The canal could not be dilated because of the impaction of what was thought at this time to be the knee or elbow (it subsequently turned out to be the latter), and no instrument could be passed into the cervix.

(2) Cæsarean section.

(3) Hysterectomy without previously opening the uterus.

Though I was anxious to avoid opening the peritoneal cavity, it was not possible, and I decided to do Cæsarean section in preference to hysterectomy: first, because it was a shorter and less severe operation to a patient in poor condition; and, secondly, I thought the risk of spreading infection was as great if not greater in opening up the pelvic cellular tissue as in incising and leaving the septic uterus.

The abdomen was opened by a high incision and the uterus was seen to be distinctly asymmetrical with a pronounced bulge to the right. The uterus was fixed to the anterior abdominal wall by a thick tightly stretched band about 2 in. long, which was attached to the *posterior surface* of the uterus, 1 in. to 1½ in., behind a line joining the uterine ends of the Fallopian tubes. There was marked axial rotation of the uterus through almost a quarter of a circle, so that the right-sided bulging mentioned above was at the expense of the posterior wall of the uterus. The band fixing the uterus was divided and it was then seen that the child lay almost entirely in the posterior wall of the uterus, which was stretched very thin; the anterior wall was short and about 1 in. in thickness. After packing off the peritoneal cavity and protecting the wound edges, the uterus was incised in the body axis through the fundus and posterior wall and a stillborn peeling child delivered. Considerable difficulty was encountered in delivering the head, which was tightly gripped in a sacculation of the posterior uterine wall, and the incision had to be continued through the edge of the sacculation before the head could be freed. The membranes were friable and unusually adherent, and this rendered their separation tedious. The uterine incision was closed with interrupted linen thread sutures, the whole operation occupying forty minutes.

The patient was extremely collapsed after the operation but improved slowly until the fifth day when she had a cerebral embolism, and she died on the eighth day after the operation.

The post-mortem was performed by the hospital pathologist, Dr. Burnet, who reported: "There is no sign of peritonitis either local or general. The uterus has involuted fairly well, the fundus reaching 2 in. above the symphysis pubis and is quite normal in shape. The edges of the uterine incision are held in accurate apposition by the sutures, but on dividing them the edges separated, and no attempt at healing has taken place. The cut edges are quite healthy in appearance. The interior of the uterus is covered with a thin greenish layer, it is not offensive and there is no suppuration in the uterine cavity or wall. There is a mass of soft fungating vegetations on the mitral valve. Death was due to septic endocarditis."

The operation for prolapse had been an amputation of the cervix uteri and ventrifixation.

DISCUSSION.

The PRESIDENT: The fundus of the uterus should not be fixed to the abdominal wall, if this can possibly be avoided, when the patient is of such age that conception might occur. I have lately treated a patient for an incisional hernia, upon whom an operation for retroflexion was performed when she was 24 years of old. She had been married several years, and was sterile, but conceived soon after the uterus was replaced. She suffered much pain whilst carrying the child, and at the delivery serious difficulties arose, the doctor fearing that the child or the mother must die. These incidents occurred in India eight years ago, and no account of them had been received from a medical man, but they were consistent with the conditions found. When the abdomen was opened the top of the fundus close to its left side, immediately in front of the line between the insertion of the Fallopian tubes, was firmly fixed to the abdominal wall, so that it seemed certain that the uterus must have been excessively contorted when the pregnancy was fully developed. Nevertheless the patient and the child survived, this showing how under most unfavourable circumstances a successful delivery might take place. But the risk to the mother and child in such circumstances must be great, and the hopeless conditions which may arise are well illustrated by Mr. Gilliatt's case.

Dr. LAPTHORN SMITH: As ventrifixation is one of my favourite operations, giving splendid results when properly performed and in suitable cases, I feel it a duty to defend it, and to explain why a great many disasters similar to the one just reported occurred among the first few hundred women who were operated on according to the directions laid down by its brilliant inventor. When I read that the back of the fundus was to be stitched to the abdominal wall I thought it was a misprint for I foresaw that if a woman by any chance became pregnant afterwards the labour could not be terminated naturally. As the growing uterus could not rise in the abdomen by its fundus, which was held in anteversion, the cervix being free would swing round and point upwards towards the liver, and when labour began the child's head would be pushed upwards instead of down into the pelvis. So when I operated a few days later on a case of retroversion with adhesions, I made a small abdominal incision, put in two fingers of the left hand, and broke up the muslin-like bands, and was then able to catch the fundus with a vulsellum and draw it up out of the incision. The anterior surface of the uterus was "criss-crossed" with a large needle, over an area a little larger than a shilling-piece, commencing below the insertion of the tubes, and extending downwards about 1¼ in., and a similar surface was made raw on the abdominal peritoneum, just below the incision. Some of these cases were my own and some were sent to me by other doctors, and I asked the latter to let me know if any of them became pregnant, and what kind of delivery they had. A few of my own became pregnant, and after a normal pregnancy, with the exception of a little dragging during the last month or two, were delivered without any difficulty whatever. Then my friends began to send me in reports that they had attended a number of their cases also quite normally, although one had complained a good deal of the dragging upwards. One case had miscarried, but it was not certain that this was due to the operation, as she had miscarried once before. But at the meeting of the American Gynæcological Society a year or two later, a great many very serious accidents were reported by different Fellows following the operations done by the first mentioned method all over the United States, which were obviously due to the back of the fundus being attached to the abdominal wall, or in other words, in forced anteversion. From that time onwards the mistake was corrected, and many thousands of operations have been followed by normal labours. Some years later I had occasion to open the abdomen of some of these cases of mine for other conditions, such as appendicitis and pus tubes, and I found that in several of them the uterus was not adherent to the abdominal wall, but was held in normal position by a fibrous ligament 2 in. or 3 in. long, which permitted some freedom of movement. But from the day on which I heard of the great number of abnormal and fatal labours I resolved never to do a ventrifixation in a woman who was in a position to become pregnant. Ventrifixation is an excellent operation to prevent the uterus from falling back into the hollow of the sacrum which is very often left after the removal of densely adherent pus tubes. I have done nearly 300 ventrifixations and rather more than 300 Alexander's operations; the latter should never be done if there are any adhesions. The failures have been between 2 and 3 per cent. in either cases; when the Alexander's method failed I did a ventrifixation. Now as to what is the best thing to do when such a case comes into our hands, if we see the case early enough, we should make a small abdominal incision and free the adhesion by cutting between two ligatures, when it will be comparatively easy to roll the fundus up to the line which will bring the cervix down. If we first see the case when labour has begun we should do the same thing, but make a larger incision, and terminate labour by Cæsarean section. On no account should any attempt be made by the vagina. This cannot be done without great danger to mother and child.

Dr. EARDLEY HOLLAND read a paper on "Cranial Mechanics."

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VOLUME THE TWELFTH

SESSION 1918-19

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1919

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Section of Odontology.

President—Mr. J. H. BADCOCK, L.R.C.P.Lond., M.R.C.S., L.D.S.Eng.

On Local Anæsthesia in Dental Operations.[1]

By F. N. DOUBLEDAY, L.R.C.P.Lond., M.R.C.S., L.D.S.Eng.

As the advent of general anæsthesia rendered possible the advances of modern surgery, so, I am confident, will local anæsthesia in the future render similar service to the dental surgeon by abolishing pain from his field of surgery. Twelve years ago, when my experiments upon local anæsthesia commenced, we were using cocaine, and experimenting with β-eucaine lactate and similar drugs. Doubtless further experience will lead to the discovery of new and better anæsthetic agents, but my experience leads me to believe that novocain is at present the safest and most satisfactory drug. The E tablets, containing 0·02 grm. of novocain and 0·0005 grm. of suprarenin are employed, one to each cubic centimetre of water, making a 2 per cent. solution of novocain. By observing the effects of solutions of tap water, normal saline, and Ringer's solution upon myself and upon patients, I have found that on the tissues there is little difference between tap water and saline solution as regards the irritation produced. Three cubic centimetres of boiling water are put into a graduated test tube, three novocain E tablets are added, the whole is boiled, and poured into a sterile drug holder; this is then drawn into a sterilized all-metal syringe, the needle is screwed into the syringe, turned nozzle upward, and tapped, to free from all air. The solution is then ready for use. If the patient has previously shown signs of susceptibility to the drug, strychnine sulphate 0·0022 grm. or atropine sulphate 0·00065 grm. is added to the solution before boiling it. If the blood-pressure is excessively high, as may occur in alcoholics, an inhalation of amyl nitrite is given before the injection to reduce the blood-pressure, for suprarenin will restore it to the normal height. The all-metal syringe fitted with a vulcanite washer, can be boiled. A short hub, with two types of needle, the short one 2 cm., and the long one 4 cm. in length, with a bayonet attachment, complete the equipment. Before inserting a needle into the soft tissues these are dried and painted with tinct. iodi. (6 per cent.).

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[1] At a meeting of the Section, held July 8, 1918.

The following are the methods of inducing anæsthesia:—

Submucous infiltration for the anæsthetization of the nerve-twigs going to the pulp and periodontal membrane, being used for filling of teeth, or for their immediate separation. It is employed for all the teeth, except the lower molars.

In the case of the maxillary incisors, canines, and pre-molars, the lip is held away from the jaw to expose the reflection of the mucous membrane from the gum to the cheek. Into the midpoint of this reflection the short needle is passed with a sharp thrust. Some resistance is encountered in the submucous tissue, but as soon as the cellular tissue of the cheek is entered the passage of the needle is easy. Half the length of the needle is introduced so that its injecting surface lies above and rather posterior to the nerve-twig in its passage through the maxilla to the apex of the root. The needle lies outside the periosteum but does not pierce it. Two to 3 c.c. of the solution are then injected into the part not too slowly, but without forcibly producing distension of the tissues. This usually takes about thirty seconds; generally at the end of that time, always within two minutes, the pulp, dentine, and periodontal membrane will be quite insensitive. In the case of the mandible the technique is similar but the injecting surface of the needle should be more directly beneath the apex of the root, because of the different course pursued by the nerves as they pass to the teeth.

Submucous anæsthesia of the maxillary molar teeth is obtained by utilizing the bayonet attachment, with the short needle, the injecting surface of the needle being directed forwards and inwards; the mouth should be nearly closed, the needle is passed into the reflection of the mucous membrane opposite the maxillary third molar and directed upwards and inwards until the posterior superior dental foramina are reached. Their position depends upon the development of the maxillary antrum; sometimes the injecting surface of the needle is opposite the foramina when the hub of the needle is at the occlusal margin of the third molar, and sometimes when the hub is at the cervical margin;

the needle is moved slowly up and down, bathing the whole of this surface with 2 to 3 c.c. of the solution. Care is taken to have the needle too high rather than too low; gravity will tend to make the fluid descend along the bony, muscular, and fascial planes.

Alveolar anæsthesia is, I believe, generally employed by dental practitioners in extraction of one or two teeth, and answers well except in the case of the lower molars. The injecting surface of the needle is passed beneath the gum, but not beneath the periosteum of the alveolar process of the tooth to be extracted; about 7 minims of the solution are inserted upon the vestibular and oral surfaces of the tooth. Anæsthesia is practically instantaneous.

Intra-alveolar anæsthesia is advocated by Mr. Parrott, of the Dental School of Birmingham, for obtaining anæsthesia in the molar region of the mandible. A few drops of the solution having been inserted beneath the gum upon the buccal surface of the root, a small opening is drilled through the outer alveolar plate into the cancellous tissue of the mandible; through this opening the needle is inserted, and a few minims of the solution are injected. Very satisfactory anæsthesia is obtained. Personally I do not care to take the risk of introducing sepsis into the cancellous tissues of the mandible. Regional anæsthesia, which we constantly employed in Berlin in 1909-10, at first inspired me with apprehension, but as I found that Mr. Rowlett and Major Kazanjian constantly used it with safety and success, their example has led me again to adopt regional anæsthesia. Sometime, possibly, I may employ Mr. Parrott's method, since it has proved successful in a base hospital in France.

Regional Anæsthesia in the Maxilla.—For this a bayonet attachment is added to the syringe; a long needle is employed if complete blocking of the infra-orbital nerve is required. The needle is inserted as nearly as possible in line with the buccal roots of the third molar, the patient having the teeth almost closed; the direction of the needle is upwards and inwards, towards the midline; its injecting surface is directed forwards towards the posterior surface of the maxilla. About 2 c.c. of the solution are introduced.

Regional Anæsthesia in the Mandible.—Two useful methods may be utilized for this purpose: (*a*) A short hub and long needle are employed. The patient has his mouth open 4 cm. The needle is passed over the premolar teeth of the opposite side, into the inner third of the anterior pillar of the fauces on the side to be anæsthetized. The needle will lie just below the occlusal surface of the upper third molar, having its injecting surface directed towards the bone. It is then passed back into a triangular space, having its base uppermost formed by the external pterygoid muscle, its inner wall formed by the internal lateral ligament and the internal pterygoid muscle, and its apex by the attachment of these to the mandible. By passing the needle in for half its depth the injecting surface will lie above and posterior to the lingula, covering the commencement of the inferior dental (alveolar) canal; 2 c.c. of the solution is then introduced. (*b*) The bayonet attachment and short needle are employed. The technique of injection is similar to the above but the short needle is used. Its advantage lies in the fact that it can be utilized when the patient cannot, or will not, open the mouth widely.

In comparing these methods, one must remember the three standards to which local anæsthesia should conform: (1) Simplicity of technique; (2) rapid and certain onset of anæsthesia; (3) absence of after-effects. Submucous anæsthesia is the simplest, and for filling teeth is unrivalled. For the extraction of teeth the alveolar anæsthesia is the most simple; while regional anæsthesia is invaluable for all operations upon the mandibular molars and for multiple extractions.

Some typical instances of the uses of local anæsthesia are as follows:—

On July 5, 1918, Mrs. J. Devitalization and removal of the pulp of the maxillary left central incisors was necessary. A submucous anæsthesia was administered at 10.20, and the pulp exposed and removed without pain at 10.25.

On July 4 Dr. X. was given a mandibular regional anæsthesia for the extraction of a broken-down second molar at 10.30. At 11 the tooth was removed without pain, though he was a very nervous and sceptical patient.

On May 3, Mrs. D. Extraction of a crowned second mandibular, which had an acute abscess upon its root, was necessary. She was five months pregnant, and particularly desired to avoid a general anæsthetic. A mandibular regional anæsthesia was given at 2.10, the tooth removed, and pus evacuated without pain at 3 p.m.

On April 9 Miss I., a hospital sister, with acute local periodontitis of the mandibular second molar; the tooth was too tender to bite on or to touch. A mandibular regional was given at 11.30. She went back to the wards and gave out her dinners, returning at 12.30, when an amalgam filling in the tooth was removed without pain, the root canals opened up, and the tooth eventually saved.

On July 8 a hospital surgeon presented himself for the removal of a small cyst in the region of an upper first molar. At 10.10 a submucous injection was given, also an injection to catch the posterior palatine nerve as it emerges from the posterior palatine foramen. At 10.20 the operation was commenced and completed without pain, although it lasted forty-five seconds, and involved a good deal of chiselling away of compact bone.

A Toxic Case.—On July 5, Miss H. presented herself for the devitalization of the maxillary left canine and the preparation of cavities in both maxillary premolars of the same side. A maxillary regional anæsthesia was administered at 9.30. At 9.55 the patient showed some blueness of her lips and slight sweating, and within half a minute fainted. She was at once given strychnine sulph. 0·0022 grm. in 1 c.c. of water, and within another half minute her pulse had recovered. She apologized for her stupidity, which she attributed to the rubber dam interfering with her respiration. I think, however, that her symptoms were really due to absorption of novocain.

Although I have used the drug in my private and hospital practice four or five times daily for several years, I have never seen a worse case than this, and believe that if only freshly made solutions were injected with absolutely sterile instruments, toxæmia would very seldom occur. Blueness of the lips and sweating over the upper lip are the early signs of novocain poisoning, and should be at once combated by the administration of strychnine as above.

I desire to acknowledge my indebtedness to Mr. Hancock, Anatomical Curator, for the admirable dissections which he has made, and lent for the purpose of the demonstration.

[The methods of inducing local anæsthesia were then demonstrated, by means of skulls and dissections, upon the epidiascope.]

DISCUSSION.

Mr. C. S. MORRIS: I have nothing new to add to the discussion. I came here rather to learn, particularly about regional anæsthesia. I have never done regional injection, but have done intra-alveolar and submucous injection frequently, the former probably some thousands of times. I prefer the submucous method wherever it is possible. It is not so rapid nor so certain in my experience, but it is less disturbing to the patient. Absorption is slower, and therefore general effects are not so noticeable. Intra-alveolar injection is very rapid indeed in its effect: as soon as the needle is withdrawn one can commence to operate with certainty. With regard to strengths of the drugs employed I prefer a 1 per cent. solution of novocain for the intra-alveolar and 2 per cent. for the submucous method. The stronger the solution the greater the toxic effect, and the more the after-pain; this is probably due to a temporary partial paralysis of the nerve-endings in control of the arterial walls producing a passing state of artificial inflammation. Some patients, however, seem to have practically no pain, though they always notice a sensation of heat. The denser the bone in intra-alveolar anæsthesia the greater the after-pain. It has been observed that patients are less easily subject to toxic effects after meals—that it is just as necessary to give a local anæsthetic on a full stomach as it is a general anæsthetic on an empty one. The only thing I should like to add is that early morning after breakfast is not a good time, or certainly not as good as after luncheon or after tea.

Mr. G. PATON POLLITT: Has Mr. Doubleday found it advantageous to alter the strength of the novocain solution used? and has he found the novocain vary to any extent since the war in its properties? Personally, I find it desirable to use three E tablets in 2 c.c. saline in order to get a rapid and complete anæsthesia. I have not seen any bad effects when using this strength.

Mr. F. N. DOUBLEDAY (in reply): I am glad that Mr. Morris has called attention to the importance of giving a local anæsthetic after a full meal. It certainly lessens the toxic effects considerably. I found that novocain went off considerably in quality soon after the beginning of the war, but it has very much improved since.

Section of Odontology.

President—Mr. G. G. CAMPION, L.D.S.Eng.

A Short Review of another Year's Work at a Jaw Injuries Centre.[1]

By GEORGE NORTHCROFT, L.D.S.Eng.

ANOTHER year of war has passed since our last President expressed the opinion that reports of the work done at the various Jaw Centres would prove useful and stimulating, forming data on which both the administrator and clinician might base their organization and treatment respectively.

It is, therefore, proposed to analyse the further figures obtainable from another year's work at the Jaw Injuries Department at No. 1 General Hospital with the hope that any conclusion arrived at may prove useful to the now large body of men interested in this subject.

The total number of cases registered, as seen from July, 1916, to October, 1918, amounts to 554, exclusive of the ordinary dental cases seen by the commissioned officers attached to the department. Of these seven have died, fifty-eight have been transferred, 398 been discharged, and ninety-one are still under treatment.

Our ratio of mandible to maxilla cases and of mandible to mandible and maxilla cases differs somewhat from our earlier figures. It may be remembered that Lindemann gives the figures as 5 : 1 : 1. Our former figures were 5 to 1 and 8½ to 1 respectively. Our present figures show a proportion of 4½ to 1 and 9½ to 1, which means we have seen more fractures of the maxilla and fewer of both mandible and maxilla.

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[1] At a meeting of the Section, held October 28, 1918.

Only one out of the seven deaths that occurred was in any way directly connected with the work of our department. This man died of septic pneumonia, and he had a general anæsthetic and several septic roots removed in order to clear up the very foul condition of his mouth. It is an open question whether he would not have succumbed in any case.

In many of the fifty-eight cases transferred treatment had already been commenced. It seems a pity that some scheme cannot be devised to lessen this lack of continuity in treatment which exists in military service.

Of the 398 men now discharged forty suffered from fractured teeth and alveolar process only, thirty-two have been treated for old standing trismus and other jaw conditions, and it is difficult to gather whether some of these cases had had a breach of continuity or not. In twenty-one cases there was no jaw injury.

Seventeen out of the remaining 305 were discharged without obtaining bony union. The seventeen cases were supplied with mechanical appliances, greatly ameliorating the patients' unfortunate condition, and enabling them to exist on a modified diet. Twenty bone-grafts have been inserted. It is too early as yet to speak of the results of all the bone-grafts, but they promise well, and 50 per cent. have already been discharged with firm and efficient bony union.

It is interesting to note that Mr. Percival Cole's and our own earlier figures proved that 10 per cent. of the cases failed to obtain union without the resort to bone-grafting. Our new figures show an increase to 12 per cent., this being probably due to the severity of several of the cases we have been called upon to treat.

It must be understood that in some of the ununited cases the jaw was in such a bad condition as to render the successful insertion of a bone-graft so doubtful that even the daring of our surgeons had to be tempered with caution. Other cases were complicated by the general physical condition of the patient, and in others, unfortunately, the patient refused operation, which was certainly a pity considering what good results our surgeons obtained as a general rule. One man, having lost the use of his tongue, it mattered little in his case whether the remaining fragments of the jaw were united by fibrous tissue or bone as no bolus of food could be manipulated.

The time factor is a very difficult one to estimate: an average of four weeks may be deducted from the total weeks in hospital in order to arrive at a general idea of the length of time these cases take.

Many cases are not discharged from the Jaw Injuries Department until after plastics have been completed, in case any alterations have to be made to their dentures. This greatly increases the average time a man with a fractured jaw remains in hospital. On the whole, one obtains the impression that the ordinary gunshot wound takes somewhat longer to heal than a civil fracture and averages from eight to twelve weeks: patience on the part of the patient and operator is rewarded, however, by excellent results after much longer periods. I am inclined to think that if a period of twelve weeks is much exceeded, with few exceptions, it is wise to contemplate the invaluable co-operation of a sympathetic surgeon.

One point that has struck me as important in going over our records is the necessity for unifying the form of discharge. I cannot help thinking that a printed form should be issued to all Jaw Centres to be filled in with such details as to make it available as a "specialist's report" for the subsequent use of the Pensions Ministry.

Section of Odontology.

President—Mr. G. G. Campion, L.D.S.Eng.

On the Nerve End-cells of the Dental Pulp.[1]

By J. Howard Mummery, D.Sc.(Hon.), M.R.C.S.

[To be published in the *Philosophical Transactions*.]

(ABSTRACT.)

(Mr. Mummery gave a lantern demonstration on this subject, accompanied by the following remarks.)

In former communications I have described the distribution of the nerves of the dental pulp to the dentine, and I hope I have demonstrated to you satisfactorily that nerve-fibres actually enter the tubes of the dentine in company with the dentinal fibril, and are distributed within the hard tissue of the dentine.

I *had* thought, and the same conclusion was arrived at in the more recent researches of the late Professor Dependorf, that these fibres passed from the plexus beneath the odontoblasts to the dentine without any further important re-arrangement within the pulp, a large number being distributed to the odontoblast cells around which they formed a plexus or enveloping network.

At the end of last year modified methods of investigation showed me that the *whole* question of the distribution of these nerve-fibres had not been completely worked out and some new and surprising facts were brought to light which I will shortly explain to you. This last investigation was embodied in a paper read before the Royal Society in May last.

The neurofibrils which arise from the axis cylinders of the medullated nerves of the pulp, pass into a plexus beneath the odontoblasts, but at the lower margin of the odontoblast layer, the fibres of this plexus are connected with a definite layer of nerve-cells. These cells are more or less stellate in form, with a clear nucleus. They are arranged in groups, situated at fairly even distances from one another. The cells have two sets of processes, which, as in the cells of the central nervous system, must be termed "axons" and "dendrons." The branched processes or "dendrons," which arise chiefly from the lower part of the cell, communicate by synapsis with the fibres of the deep plexus, and they also give off fine divisions which surround the odontoblasts, while from the distal end of the cell a long unbranched process or "axon" is given off which passes direct to the dentine and enters the tubule in company with the dentinal fibril.

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[1] At a meeting of the Section, held November 25, 1918.

This whole investigation has occupied a great many years and it is only by gradually advancing steps that one has been able to arrive at the true explanation of this much debated problem, but I think it will appear that we have now reached a more definite solution of it, at least so far as the histological part of the problem is concerned.

The chief point which remains to be cleared up is, what portion of this nerve distribution consists of trophic fibres and what of purely sensory fibres? We know the dentine and the pulp are sensitive, and that, as Langley has shown, there are present in association with medullated fibres some non-medullated fibres forming the autonomic system, "including not only what has hitherto been known as the sympathetic system, but also other nerve-fibres—distributed to the visceral and vascular systems"—and to secretory glands.

This mode of distribution of the nerves of the tooth is altogether unexpected and remarkable, for we appear to have a distinct "nerve end-organ" from which the dentine is supplied with sensory fibres and a sensory "nerve end-organ" or "sensory neuron" is not known in any other part of the body. Sensory nerves are described either as ending in ramifications of the axis cylinder and its ultimate fibres which terminate between the epithelium cells of the sensory surface, or in special organs, as the tactile corpuscles and Pacinian bodies which are composed of the connective tissue sheath of the nerve-fibre. In the nerve-cells of the pulp we have however apparently a peripheral sensory end-organ from which the final distribution takes place. It appears to be, as an eminent authority says: "the interpolation of a neuron at the peripheral end of a sensory neuron, an unheard of thing until now." However anomalous such a mode of distribution may appear to be, I think there can be no escape from the evidence that such an organ is present in the teeth of man.

Bone-grafting in Ununited Fractures of the Mandible, with Special Reference to the Pedicle Graft.[1]

By PERCIVAL COLE, F.R.C.S.Eng., and CHAS. H. BUBB, L.D.S.

(ABSTRACT.)

[Full text in the *British Medical Journal*, January 18, 1919, p. 67.]

THE evolution of the bone-graft as applied to ununited fractures of the mandible is a matter of considerable interest. Since the outbreak of war orthodox opinion has undergone a radical change. The extent of this change can be gauged by the perusal of the *Proceedings* of this Section.

As to the number of ununited fractures existent information is very scant, but certain figures are available. Northcroft had 10 per cent. non-unions in his series, Forty had 16 per cent., and we, counting all types of cases, had 11 per cent. It may fairly be estimated that non-union occurs in approximately 10 per cent. of all mandibular fractures. If this be so, the number of ununited fractures must be considerable, for over 1,300 cases have been treated at the King George Hospital alone. That non-union can only be remedied by operative measures is an admitted fact. It is on that account that we have brought for your inspection every available case, irrespective of their condition or the date of operation. These cases number twenty-three, and include nineteen pedicle grafts and four free transplants. In addition, cases have been shown which are regarded as suitable for one or the other of these grafting operations.

The proportionately large number of pedicle grafts will be noted. We have employed this method in thirty-four cases. Free transplants have been employed in twelve cases only. The latter method is only adopted when a pedicle graft cannot be utilized. The pedicle graft operation has been described in previous communications. We propose briefly to summarize the conditions our experience shows to be necessary to permit of the performance of a pedicle graft operation.

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[1] At a meeting of the Section, held November 25, 1918.

(1) *Site of Fracture.*—The loss of tissue must implicate the horizontal portion of the bone—that is, the lesion must be situated at or in front of the angle.

(2) *Size of the Gap.*—This should usually not exceed 4 cm. In favourable circumstances it is possible to cut a thick, well-nourished graft of 6 cm. in length, and a gap of 5 cm. (before trimming) may thus be dealt with, if end-to-end union is resorted to.

(3) *Condition of the Soft Parts.*—It is necessary that the tissues of the submaxillary triangle should be free from scar tissue on the side from which the graft is to be cut. It is extraordinary how frequently this area escapes even when the soft tissues of the face are extensively damaged.

As stated, thirty-four cases have been dealt with by this method. In twenty-three the result is known, and of these twenty-one, or over 90 per cent., have been completely successful. In the two remaining cases the patients are thoroughly satisfied, but we could only regard their condition as considerably improved: they are counted as failures in the appended table of results. The pedicle graft operation permits of the utilization of a portion of living bone, possessed of its own blood supply passing to it from a natural musculo-fascial pedicle. Free transplants are only employed when conditions do not permit the use of a pedicle graft.

Of our own twelve cases, the result is known in ten, and of these, seven have been completely successful: this gives a percentage success of 70. Splints are removed in from three to six months. Progress is slow, and firm consolidation cannot be expected in less than from six months to a year. The position as regards all cases of non-union dealt with by us may be tabulated thus:—

Nature of operation	Number of cases	Result known	Failure	Success
Plating	2	2	2	0
Wiring	20	20	1	19
Pedicle graft	34	23	2	21
Free transplant	12	10	3	7
Operation abandoned	3	3	3	0
Totals	71	58	11 (19 per cent.)	47 (81 per cent.)

No selection whatever has been exercised: we have operated on every case submitted to us. It will be noted that the balance is heavily weighted against ourselves. Thus three cases are counted as failures, in which the physical conditions found by exploration rendered in our judgment any further steps impracticable. Again, "no improvement" column has been included, though in most cases improvement has been considerable. In no case has the patient's condition, general or local, been adversely affected by operation. Finally, there has been no mortality and no complication of a nature to cause alarm.

DISCUSSION.

Captain FRANK J. TAINTER, M.C., U.S. Army: Transplanting bone is now an established surgical procedure. The success, however, varies in proportion to the ultra-aseptic technique adopted, and the condition of the parts which are not always what is desired—following the severe injury which necessitates this major procedure. As a matter of fact, we know that tissues harbour infectious products for great lengths of time; these may never become pyogenic until after they have been disturbed by surgical trauma, or by the introduction of foreign bodies, as, for instance, free bone-grafts. There is perhaps no other part of the body which lends itself so badly to the implantation of dead bone-grafts as do the lower jaws. This, of course, is due to the wound previously being bathed, day and night, with all forms of bacteria. It is quite obvious that where we have a choice, if we can fill in the defect with a bone-graft, supplied and nourished by its own blood supply—in short, a *live* bone-graft — this borders on the ideal, and should always be used. I have done the pedicle graft operation myself in eleven cases, and have been struck by the great vascularity of the pedicle. The pedicles, without exception, have all consisted of one or both anterior bellies of the digastric with platysma and cervical fascia. In one case of my series I was amazed to find a very large amount of bleeding from an artery in the bone after it was detached from the lower border of the mandible; I have been attached to Mr. Cole's clinic quite long enough to note the ultimate results in his cases. Operation had to be abandoned in several cases because there remained so little of the ramus, which was drawn up out of reach. Mr. Cole, in his modesty, has classed these cases as failures when, in fact, they should not have been. The results have been so brilliant that I feel I have something good to take back with me to the States for our unfortunate boys who must be repatriated in the best possible condition in which we can place them. Mr. Cole has spoken to the profession the last word on this subject of jaw restitution for bony defects.

Major H. P. PICKERILL, N.Z.M.C.: Mr. Cole's patients show good functional results which may improve in time. Bone-grafting is not necessary in all cases of ununited fracture, as numerous patients have grown their own grafts under physiological stimulus of function in healthy tissues. Indiscriminate extraction of teeth is bad, but equally so are curetting and numerous sequestrectomies. The vitality of the mandibular bone is such that the majority of fragments can be saved provided dead spaces be eliminated and frequent irrigation carried out. I doubt the practical utility of the pedicle, and almost always use a tibial free graft, the size and shape of which is consistent with the size, shape and mechanics of the mandible, and secures better permanent results, especially as regards eating.

Section of Odontology.

President—Mr. G. G. Campion, L.D.S.Eng.

Intra-oral Skin-grafting: The Establishment of the Buccal Sulcus.[1]

By H. P. Pickerill, M.D., M.D.S., Major, N.Z.M.C.

(Officer in Command, New Zealand Section, Queen's Hospital, Sidcup.)

It is necessary that there should be adequate buccal and labial sulci in order that both the jaws, lips, tongue and cheeks should perform their natural and proper functions of both mastication and speech.

It is also necessary that adequate sulci should exist in order that functional artificial dentures may be worn. The obliteration of buccal sulci means unstable dentures, since it is largely upon the grip of dentures upon the external surfaces of the alveolar processes that the stability of artificial dentures depends.

It is also recognized that the persistence of a hypertrophied frenum labii is a frequent cause of separation of the two upper central incisors. In the same way I think the dense adhesions one so frequently sees between lips or cheeks and jaws obliterating the sulci are frequently causal factors in preventing or delaying firm osseous union from taking place.

Obliteration.

The buccal and labial sulci may become obliterated either actually or relatively from general causes, the chief of which are :—

(*a*) Excessive atrophy of the alveolar processes. As is well known this occurs as a result of the prolonged infection and suppuration of chronic dental arthritis;[1] it also occurs from prolonged disuse of the alveolar processes; lack of the stimulus of function transmitted either through natural or artificial teeth leads to a corresponding atrophy of the process, and thus to a flattening out or relative obliteration of the sulci.

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[1] At a meeting of the Section, held December 9, 1918.

(*b*) In civilian dental practice it is well known that local obliterations of the sulci in the form of hypertrophied buccal and labial frena cause much trouble in the stabilizing of artificial dentures.

(*c*) Ulcerations, due to alveolar abscesses, ulcerative or gangrenous stomatitis also occasionally obliterate the buccal sulci, owing to adhesions forming between the cheek and jaw in the process of healing. Under this heading may also be included the effects of severe burns and corrosive fluids.

(*d*) Gunshot wounds of the jaws as seen during the present war are almost invariably followed by adhesions more or less great between the lips and cheeks and the jaws, obliterating the buccal sulci, rendering plastic restorations of the lips in particular frequently abortive, and the wearing of any artificial prosthesis either impossible or extremely inefficient and uncomfortable.

TREATMENT.

Until recently the methods of treatment of this condition have been, in my opinion, more or less unsatisfactory. The methods which I have employed have been the following:—

(1) *Preventive.*—In a certain number of cases the early use of "shields" of vulcanite or metal may prevent adhesions forming, but in severe cases will not prevent subsequent contractions from taking place.

(2) *Stretching.*—For this some arrangement of rubber-covered springs resting on the adhesions or the obliterated sulci is necessary, or padded vulcanite shields may be inserted, and the size of the pads periodically increased. This method, however, is slow, tedious and ineffective except in trivial cases. Moreover, stretched scar tissue always tends in time to contract again (unless constant pressure is kept up).

(3) *Simple Division of the Adhesion and so the Immediate Establishment of a Buccal or Labial Sulcus.*—This appears quite simple, and at the time may appear to give an excellent result, but one is left with

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[1] I prefer this term to "pyorrhœa" as being more correct anatomically and surgically.

a raw ulcerating surface, which will inevitably contract, and thus recurrence is absolutely certain.

(4) *Flap Method.*—In order to obviate some of the above objections, about eighteen months ago I devised a method of raising a flap of mucous membrane from the cheek, and having made a sulcus by incision and curetted the alveolar bone, planting the flap down on the raw bone area and holding it there with a prosthetic appliance, the raw area in the cheek being closed as far as possible with sutures. This method gave greatly improved results, but was not entirely satisfactory on account of some contraction occurring in the cheek.

(5) *Epithelial Inlays.*—This method as practised by Essex and others on the Continent, and at this hospital by Major Gillies, consisted in endeavouring to establish a buccal sulcus by approaching the obliteration from the exterior of the lip or cheek, and thus doing an aseptic skin-graft operation. This was a considerable advance, and was the first attempt to obtain a definitely skin-lined sulcus as far as I am aware. The disadvantages of this method are: (*a*) The extreme difficulty of establishing the skin-graft evenly in close proximity to the buccal mucous membrane when working from the outside. Thus when the operation is successful, it is more of a pocket than a sulcus which is formed. (*b*) The frequency with which such inlay operations suppurate and thus produce additional scarring on the face, necessitating further operation at a later date to remove the scars.

With the above experiences it was but a short step to the next stage —*intra-oral skin-grafting.* I argued thus: (*a*) the establishment of a sulcus by direct incision undoubtedly gives the best-shaped sulcus; (*b*) my buccal flap operation would be quite satisfactory if contraction in the cheek could be prevented, and if sufficient tissue were always available; (*c*) skin-grafts frequently "take" even when bathed in pus for many days; (*d*) the superficial cells of the epidermis, which compose a Thiersch graft, must have a very high resistance to surface organisms, and are able to live in spite of their presence, or organisms would penetrate a skin surface, and severe ulcerations from trivial injuries of the skin surface would be common; (*e*) I have observed in other skin-grafting operations that pressure, even and continuous—the obliteration of dead spaces—seemed to be the most essential factor for success.

I therefore determined in February, 1918, to try the skin-grafting of a re-established buccal sulcus directly into the mouth and under pressure. I was extremely gratified by immediate success, and have continued to use the method ever since, and no single case has failed. Some have been better than others, but the fault where there has been one, has been mine, due to insufficient or insufficiently continuous pressure. Given *accurate* technique, the establishment of the sulcus and the skin-grafting of its surface will be certain in every case. The method of procedure is as follows:—

(*a*) *When Adjacent Teeth are Present.*—In this case I prefer to have an appliance similar to a dental splint, constructed previously, carrying an arm attached by screws to the "splint." To the arm is attached a perforated shield, which will approximately fit in the sulcus when established. An incision is made dividing the "adhesions," keeping the knife close to the bone. Bleeding is arrested. The shield is covered with modelling composition and an "impression" obtained of the raw area of the sulcus. This is removed. A Thiersch skin graft is cut from the arm (or leg) and placed raw surface upwards upon the impression of the sulcus: it is smoothed down flat and passed up into place and the arm secured by the screw provided. Thus the skin-graft is pressed evenly into all the unevennesses of the sulcus, and maintained there with constant pressure.

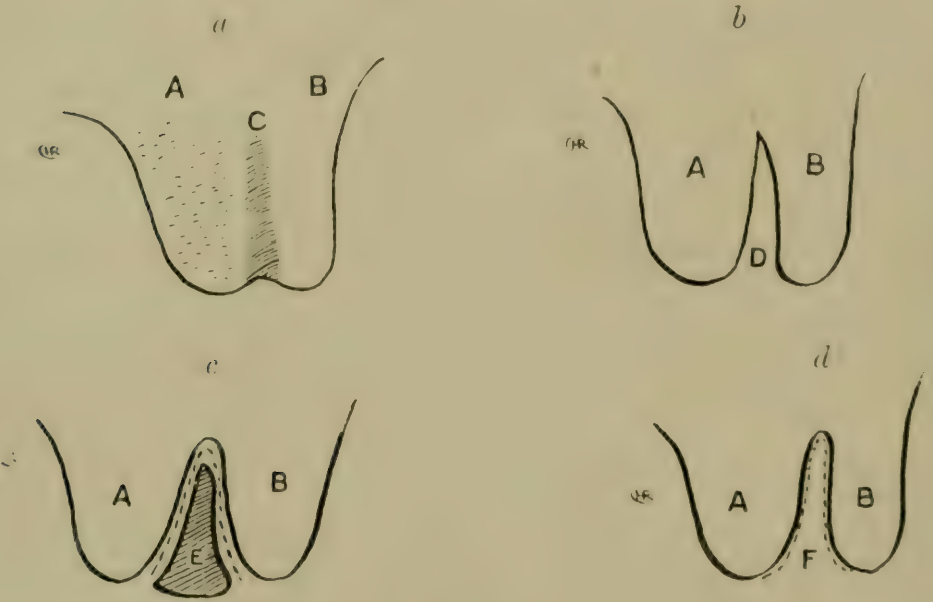

FIG. 1.

A, alveolar process; B, lip or cheek; C, obliterated sulcus; D, adhesions divided; E, composition impression covered with skin graft *in situ*; F, sulcus established, covered with epithelium on both surfaces.

(*b*) *When no Teeth are Present.*—In this case the procedure is the same in all particulars except that I ligature the "impression" into place and maintain it there with circumferential silk-worm gut ligatures in the lower jaw or by passing sutures through the palatal muco-periosteum and cheek or lip in the upper jaw.

There is another class of case in which I have found this method useful. Private H. was admitted to this hospital with an old united fracture of the jaw, but with elevation of the posterior fragment, so that the upper molars (three) impinged upon the muco-periosteum of the mandible (edentulous posteriorly), thus rendering the fitting of a lower denture impossible. I am aware that some would advise the extraction of the upper molars, but not being an advocate of the unnecessary sacrifice of teeth, I proceeded as follows with very satisfactory results. The elevated alveolar process of the mandible of the left side was resected. This of course produced a "relative" obliteration of the buccal sulcus, which would probably have become progressively worse.

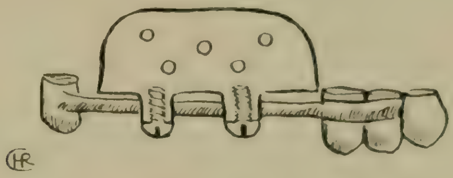

FIG. 2.

Diagram of appliance to hold composition in place when teeth are available.

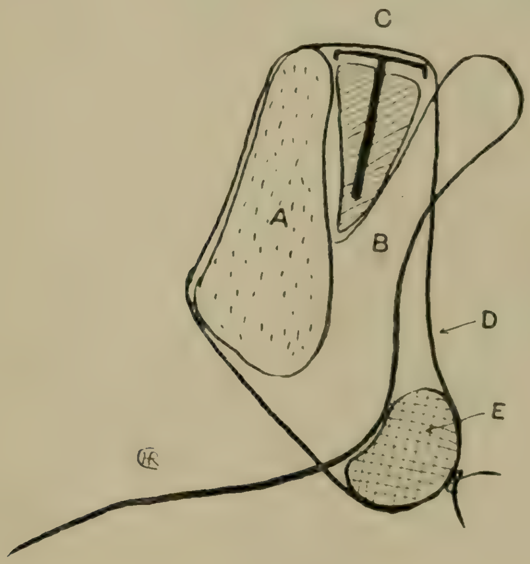

FIG. 3.

Diagram of method of retaining composition when no teeth are available. A, aw ; B, lip ; C, composition reinforced with sheet pewter ; D, circumferential ligatures ; E, tied externally over pad soaked in tincture of benzoin.

So at the same operation I deepened the buccal sulcus by incision, and implanted a skin graft on the raw areas. The composition was held by an appliance attached to the incisor teeth. The graft took excellently, and the patient now has perfect function with a partial lower denture.

REMARKS.

General or local anæsthesia may be used as indicated in each particular case.

The composition I leave in position for ten days, and then remove and replace at once by a prosthetic appliance—i.e., permanent or temporary denture or vulcanite shield.

The method has yielded such uniformly good results to all who have used it, that I think its use should be made widely known to all those dental surgeons who are engaged in treatment of gunshot fractures of the jaw. I think, moreover, that in civilian practice this procedure will be of not inconsiderable use and advantage in a great number of cases.

Section of Odontology.

President—Mr. G. G. Campion, L.D.S.Eng.

Food Deficiencies as a Factor influencing the Calcification and Fixation of the Teeth.[1]

By F. M. Wells, Major, C.A.M.C.

I cannot lay claim to any special knowledge of these accessory food factors or so-called "vitamines." In fact I have only a very superficial and inadequate acquaintance with the various and varying theories that have been held on this subject.

The problem of so-called "vitamines" has of late years received an increased amount of attention, and an abundance of facts which seem calculated to enlarge our conception of the dietetic value of foods is forthcoming from very different sources. The investigations made have shown that satisfactory growth of nutrition cannot be maintained upon a diet containing protein, fat, carbohydrate, salts and water, but that, in addition, certain other essential constituents are necessary, about which as yet, very little is known. These are known as accessory food factors or "vitamines": they are present in a very small amount in most natural foods, and though their chemical nature is unknown, healthy life is impossible in their absence.

The diseases that are known to be produced by defect of these accessory factors are beri-beri and scurvy, others which are believed to be caused by defect of accessory factors but of which the proof is incomplete, are rickets, sprue and pellagra.

Before proceeding with the experimental part of the work done by Dr. Zilva and myself, I will give a short review of the work on scurvy and rickets and a few of the many theories that have been advanced as to the cause of the rapid increase of tooth decay.

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[1] At a meeting of the Section, held December 9, 1918.

The ætiology of beri-beri is well understood to-day, but as this disease is not endemic in this country and rarely occurs in infants, and as far as I know causes no dental disease, it is not to our interest to discuss it here to-night.

Thrush or "sprue" is interesting to dentists, but as yet I know of no scientific work done on this disease.

Scurvy is not a new disease, as some people are led to believe. A description of scurvy is to be found in the narrative of the campaign of the Christian Army in Egypt under Louis IX, about the year 1260. The historian of that crusade was not only eye-witness of the disease in others but was himself attacked by it. He speaks of the debility and tendency to swoon, black spots on the legs, bleeding from the nose, and the livid and spongy condition of the gums, &c. The barbers used to go around trimming the gums of the sufferers. Scurvy has unquestionably existed in the north of Europe from the most remote antiquity. That we have no mention of it in the early history of the northern nations must be imputed to the ignorance of the people, especially as regards medicine.

Well-marked, so-called florid, scurvy among infants was not an uncommon occurrence about the period 1875-1900, when artificial feeding was popular and patent foods were enthusiastically adopted. At the present day it is probable that mild incipient scurvy is more common than is usually believed. This condition is solely due to the rapid increase of artificial feeding of infants. Obscure though the exact ætiology of infantile scurvy may be, it is probable from clinical facts that this affection arises from causes distinct from those that produce rickets. Almost all that is known of the pathology of scurvy amongst infants is due to the investigations of Sir Thomas Barlow and Professor Still, of the Great Ormond Street Children's Hospital, London.

In adult scurvy we have conclusive proof that the prolonged deprivation of fresh vegetables, or their equivalent, is certain to bring about a scorbutic condition. We are also sufficiently familiar with the fact that proprietary infant foods do not contain the accessory factors that are necessary to prevent scurvy. It has been demonstrated experimentally that those accessory factors which prevent scurvy are contained in human milk and in the milk of the cow, but not in large quantities, and they are destroyed by the process of heating to a degree dependent on the time and temperature of heating. It is clear then, and fair to say, that the further we get from a natural food which is consumed in the raw condition, like the mother's milk, the more frequent will be the risk of the disease. Dried milk contains less of the antiscorbutic factor than raw milk.

The age at which we should be on the *qui vive* for the initial symptoms of scurvy, is about the eighth month of infantile life. It is exceptional for the symptoms to appear earlier. This point is of considerable importance in diagnosis. Professor Still's clinical picture of the fully-developed disease is striking enough; an infant which has been fed upon one of the patent foods, with or without milk, or on milk which has been condensed, sterilized, or otherwise altered, has been ailing for some weeks, has taken food badly and probably lost weight. Moreover, the mother says it cries whenever it is touched, and, as she puts it, "has lost the use of its limbs." The infant is pale, it lies quiet perhaps until it is approached, when it cries out in obvious dread of being touched; the legs lie motionless, usually with the thighs slightly abducted and averted and the knee slightly flexed; the arms are less often affected. There may be some swelling of part of one or other of the limbs, obliterating the natural curves. Any handling of the affected limbs causes a piteous cry, evidently of acute pain. If teeth are present the gums around them are swollen and purple, occasionally projecting like a mass of granulations almost completely hiding the teeth, and bleeding readily when touched. The urine is perhaps smoky, if not red with blood. Such in outline is the characteristic picture of infantile scurvy.

Rickets is believed to be a disorder of nutrition, and as such affects the whole system. The bone changes are only part of a general disease. The child may suffer severely and yet show so slight a degree of rachitic change in the bones that if only the osseous system were considered the disease might almost pass unnoticed. The temperature is normal, even during the most active stage of the disease. A rise in temperature is almost always due to some complication. There is little to be said in favour of an infective origin. Rickets amongst children in the British Isles has grown to a very alarming state. From 50 per cent. to 80 per cent. in London clinics show signs of rickets to a more or less marked degree. It is found in the Dominions to a less extent, but it is quite common.

Symptoms.—Delayed dentition is one of the most constant symptoms. It was found in thirty-two out of forty-two consecutive cases of rickets between nine months and three years old. Frequently no teeth have appeared at the end of the first year. Rarely their appearance is delayed beyond the period of eighteen months. If dentition has begun before the onset of rickets, it is often arrested for several months. There is a striking tendency to very early caries; even before the tooth is fully cut the enamel at the cutting edge is often completely destroyed. Amongst other symptoms and signs are sweating of the head during sleep; large protuberant abdomen; reluctance or inability to stand, which makes the child late in learning to walk; the softness of the bones and ligaments, which makes the bones bend and the joints yield, with resulting bandy-leg, knock-knee, or other deformity, stooping curve of the spine; large size of the head, which is square shaped, with all the tendency to convulsive disorders and to catarrh of the respiratory and alimentary tract, adenoids, chest affections, indigestion, &c. The most prominent symptoms, no doubt, are those that affect the bones, but in rickets there is a general disturbance of metabolism and its effects are not limited to any one tissue of the organism. Until a cure is effected the disease prevents satisfactory nutrition of the bones and teeth, stunts and deforms the bones of the face and jaws, &c.; and the damaging results are in evidence throughout the whole of the patient's life, even after recovery from the disease itself. This great affliction, which appears to become more common every day, if not altogether prevented, can easily be remedied, if the baby is started from the outset on a proper diet, which is the mother's milk and which every baby needs. If the conditions are such that the baby is prevented from getting its proper diet and has to be artificially fed, too much care cannot be exercised in watching its progress for the first eighteen months, especially in regard to the weight of the infant. The early stages of scurvy and rickets are almost impossible to diagnose and a baby that has to be fed on an artificial diet should never be allowed the use of a teat or "dummy" as the diseased condition of the bones, caused by imperfection in nutrition, with constant suction of a "dummy," will rapidly produce badly developed jaws and nose, followed by adenoids, nasal obstruction, irregular articulation of the teeth, mouth breathing, and the whole train of evils to which this condition gives rise. It is important that a baby's weight should be kept normal. Rickety babies usually appear to be fat. If the disease is to be checked before serious harm is done to the child, the early signs must be recognized as soon as possible. The first symptoms appear in *pain from teething.* (Painful teething in children is just as much a disease as any other baby ailment.) The second symptom is *late dentition.* (Every baby should have at least two teeth between the sixth and seventh month.) If the child shows these signs rickets should be suspected. It is amazing that these evils are known to exist, and it has been pointed out that they are due solely to improper diet, and yet medical men will allow mothers, who are quite capable of suckling their infants, to feed them on artificial foods and so deprive the infant of its heritage. Perhaps the fault lies in not having absolute scientific evidence to show that a faulty diet is the direct cause of improper fixation and calcification of the hard tissue.

Now we will take up some of the most important theories that have been advanced during the past fifty years, as to what is the cause of the rapid increase of tooth decay. Miller's "chemico-parasitic theory," which accounts for the phenomena of caries of the teeth, does not explain the rapid progress made in the increase of dental caries accompanying civilization in the past hundred years. In view of the fact that the incidence of dental caries has been greatly on the increase especially in the past fifty years, it would seem obvious that our present mode of treatment of dental caries has been radically wrong, that the judgment of time and experience have alike condemned it, and that such measures as are now in vogue have proved futile to arrest the progress of what has become the most prevalent disease of civilized communities.

Heredity.—I have no intention, for I have not the necessary knowledge, to express an opinion on heredity. The only information that is at our disposal in regard to this theory is statistics of family history, which appear to throw very little light on the subject.

Chemical analysis of our teeth has yielded us so far little or no information, and biochemistry is, as yet, still in its infancy.

To what extent do "vitamines" affect the enamel? We do not, at present, know how far differences in their action may modify the rest of the tooth, but the connexion which appears to exist between the enamel and the odontoblastic cells is direct; if this is not so I should call it an "inborn error of metabolism." I know that I shall be severely criticized by my friend Mr. Mummery, and very generally by all of the leading dental anatomists, who state, as I understand it, that when the enamel is once formed it is formed for good, but strong reasons have convinced me that this belief is not based on such sure grounds as is generally supposed.

I made a trip to Scotland last month with a view to studying the diet conditions in the Highlands and Lowlands. I have always been led to believe that the Highland Scotch had better bones than are to be found in any part of the British Isles, and I thoroughly believe they have. This is largely accounted for by their simple diet of natural foods. Up to a few years ago the Highlanders' meals were very simple. Their breakfast consisted of brose at 6 a.m. Brose is made by pouring boiling water over oatmeal, stirring all the time, and adding a little salt. It was eaten with milk, syrup or treacle, with some butter. The next meal was between 11 and 12 o'clock, which consisted of potatoes and salt herring. No bread was eaten, but for the second course a bowl of milk and a piece of oatcake were taken. This was a universal dinner all through the North of Scotland. The next meal was at about 6 p.m. Again brose, but as a variation it was made with boiling milk, instead of boiling water. Between the mid-day meal and supper a glass of milk was taken, and in later years tea came in. The only variation from this diet was on Sundays. Breakfast was usually later and dinner, which consisted of boiled cabbage and turnips, was served after church. For supper on Sunday there were boiled potatoes and fresh fish, and sometimes pork, but the pork was very sparingly used, as one pig had to last a family for the whole of the winter. Beef was rarely eaten.

Rickets is unknown to Dr. Bremner, of the Department of Public Health for the County of Sutherland. He told me there has not been a case in his district. He also stated that the proportion of artificially-fed infants was practically *nil*. A mother looked upon it as a disgrace if she was unable to feed her child, and it is only recently there has been a small amount of hand feeding in the coast towns where the women are compelled to hawk their fish and render other duties, which make it impossible for them to breast-feed their children, but away from the coast there is practically no artificial feeding.

A remarkable thing among the old type of fishermen to-day is that there is hardly any decay in the teeth of men of 70 to 80 years of age, but the young generation has quite a considerable number of decayed teeth.

The following is a little incident which I would like to relate. I happened to call on a very intelligent old lady, aged 81, and after a short conversation with her relating to the subject of my trip, she immediately told me that the curse of the Highland Scotch to-day is tea. All the crofters or poor farmers keep the teapot going from morning until night, and are sipping tea all day long. I remarked that she had a very good set of teeth, and she told me that she had lost one tooth through an accident, and that she had never had a toothbrush in the house. I might state here that a toothbrush was hardly ever known among the last generation of the Highland Scotch. However, I will refer to the toothbrush and its uses later on.

Dr. Bremner gave me a large amount of valuable information in regard to his examination of the men for the Army and Navy from his district. He found that all the men over 20 years of age and up to 45 had exceptionally good teeth; as they advanced in years their teeth showed wear but no decay, but there was a vast difference in the teeth of the men under 20 years of age. I asked him what he thought it was due to, and he said he thought it was due to nothing else except to the rapid change in the diet. He also stated that there is an increase in tuberculosis, due to the same cause. The crofters are taking to artificial foods and discarding the natural foods. The oatmeal and potatoes are being exchanged with the grocers for white bread, jam, syrup, and tea. These are all less valuable foods as regards content of accessory factors. I was told by one Public Health Officer in the Highlands of Scotland that there are a great many families at the present time who make two meals a day off bread and jam or treacle, that their mid-day meal consists of potatoes and fish, and that this class have become inveterate tea drinkers.

What a different condition presents itself in the Lowlands. I found in the Clyde district a different type of Scotchman altogether. The great reason for this is, to my mind, the diet of more refined foods. The people are better housed, and sanitary conditions are better than in the North. Rickets and scurvy in the infant are as bad in this district as in any part of the British Isles, and they have left their mark on the older generation. Nearly every person is wearing false teeth, or presents a row of decayed teeth when the mouth is opened.

THE USE OF THE TOOTHBRUSH AND ANTISEPTICS IN THE MOUTH.

Has oral prophylaxis been a success as a preventive against tooth decay? Our great army of dentists and teachers all over the civilized world are recommending the diligent use of the toothbrush. One dentist that I know conceived the idea that he could prevent his patients' teeth from decaying altogether by oral prophylactic measures. His method was to get his patients to come to his office as often as he thought desirable, once a week or once in two weeks, &c., and thoroughly cleanse all the interproximal spaces. This kind of practice did not last long, as the cavities were multiplying so rapidly that he had either to send his patients to another dentist or return to his general practice. He decided on taking no chance of losing his patients, so he went back to his general practice.

No, I do not believe the toothbrush ever prevents tooth decay. If the enamel will not resist the action of the fluids of the mouth, the toothbrush will not prevent the onset of decay on the surface of the teeth or in the interproximal spaces. It has been found that mouths that are immune to decay very often harbour a greater number of fermentative bacteria than do the mouths of patients where decay is rampant. The plain fact is, that the toothbrush is a dangerous germ-ridden instrument, which it is impossible to sterilize. It cannot be boiled, and we have no disinfectant which would render it aseptic and not leave it unfit for further use.

On my way back from Jena to Canada in 1904, I called on my old friend Mr. Gilmour in Liverpool, and I was telling him about some experiments that I had made during the summer with different tooth-pastes and washes that are in general use. I showed him my results and told him how short a period the antiseptic properties of these washes would last, and of the increased growth of bacteria over the normal within a few hours' time, due to the destructive effect of the tooth-pastes and washes on the delicate mucous membrane of the mouth, causing an impaired condition of the natural resistance and thereby intensifying the growth of bacteria. In no case did the antiseptic action last over fifteen minutes. He then told me that he had been watching the results of different patients of his upon whom he could rely as being very careful to cleanse the mouth out regularly, and that frequently they had an increased amount of work to be done over the previous year. On turning up his records I found some of his patients to whom he was referring were using the same pastes and washes with which I had experimented.

For our own comfort we are bound to keep the toothbrush in use, but it is not going to prevent tooth decay. Tartar has never decayed teeth; on the other hand, in numbers of cases it has, I believe, saved them from decay. If you gather records of conditions of the teeth extending over a large area, you will always find the least decay where the toothbrush is not in use, and this has been my universal experience.

We have, therefore, to look to some other source to find the true cause of tooth decay, and I think it can usually be traced to the improper diet of the child in infancy.

Antiseptic Washes.—The conception which prevails generally among medical and dental practitioners in regard to the use of antiseptic washes in the throat and mouth is singularly confusing and confused. It is credited by them with consistent and often contradictory attributes, so great is the lack of clearness and precision in scientific work on this subject, when it approaches this topic, which has so weighty a bearing on our daily work. I began to despair of ever being able to get an antiseptic wash that we should be able to use on such a delicate structure as the mucous membrane of the mouth and throat; but through the work of Dr. Browning (of the Bland-Sutton Institute) on flavine, we have now a wash that will act as a good antiseptic, without causing irritation, and its retentive powers are such that it keeps down the bacterial flora for hours, instead of a few minutes.

Experimental.

The following account is quoted from the paper by Zilva and Wells, now in course of publication by the Royal Society. The report is based on histological work carried out on the teeth and jaws obtained from considerably over 100 animals.

Method of Investigation.—For the purpose of this inquiry the lower incisor and molar teeth of the guinea-pig were chosen. As in all rodents, these teeth grow from persistent pulp and are never shed. The teeth while still *in situ* in the lower jaw were decalcified and sections made in an antero-posterior direction, parallel to the long axis. In advanced cases of scurvy the teeth were apparently sound, but useless, inasmuch as they had been loosened by the gradual absorption of the cement membrane of the alveolar sockets, which had left that portion below the neck exposed. As a result there must have occurred that peculiar periostitic pain, or something analogous, which follows in the case of human patients who are suffering from shrunken alveoli. These teeth presented, in addition, all the appearance of the changes of senility. A great number of longitudinal and transverse sections suitable for microscopic examination were obtained. The revelations offered by these sections are of a particularly interesting nature. Note the fine line of the dentine and odontoblastic cells in figs. 1 and 2 of normal teeth as compared with figs. 3 and 4, which show sections of teeth from animals suffering from scurvy.

Figs. 1 and 2 are of a normal tooth and give one the opportunity of studying the histology and histo-pathology of the dental pulp in its normal relationship to dentine. The enamel is not quite as heavy as in the natural tooth on account of the decalcifying process which has reduced it to about half its thickness, but it gives one an excellent example of the typical appearance of the blood-vessels in relationship to the dentine, the fine cellular tissue and odontoblastic cells when in a normal condition.

Figs. 3 and 4. It is obvious that the term "fibrosis," or fibroid degeneration, is the only one which can with certainty be applied to this particular form under notice. There is no doubt that it is a specimen of degeneration and it is equally easy to eliminate those other degenerative varieties, such as the mucous, calcareous or fatty, which animal tissues may undergo.

The present instance affords an opportunity of examining certain structural metamorphoses in the pulp, which are believed not to be dependent on any inflammatory condition, but simply attendant on and produced by altered metabolism or constitutional changes, due to the diets.

Minute descriptions have been published of pulp nodules, calcareous pulps, and elaborate work on ulcers and tumours connected therewith, but this affection seems to have been unknown or overlooked by the pathologists both in Europe and America. In no case does one find the condition, as depicted in fig. 3, brought about by a dietetic experiment. It is evident in this picture that in complete pulpous fibrosis no cellular elements of any description occurred. It is clear at once, and it is an important fact, that no trace of cellular organization, no trace of cell nuclei, no trace of interstitial cement substances can be found anywhere. Nerves, cells, blood-vessels and odontoblasts have all shared the process of fibrification and are no longer recognizable. The fine cellular connective tissue, which is but a loose mass of network in the normal state, has either become grossly hypertrophied or quite obliterated and its place taken by a new structure, firm and fibrous, devoid of cells, nuclei, or any regular arrangement of constituted parts.

.Figs. 3 and 4 show an advanced state of scurvy. The irregular osteoid condition of the dentine is well marked and the different refractive appearance of the dentine is probably due to the hæmorrhagic condition of the dentinal fibrils. In a scurvy tooth the condition persists right up to the apex of the root; the trouble at first appears to start in the odontoblastic cells at the top of the pulp, working towards the apex, followed by distended blood-vessels and hæmorrhage, then complete fibroid degeneration follows.

With the object of obtaining some insight into the condition of the

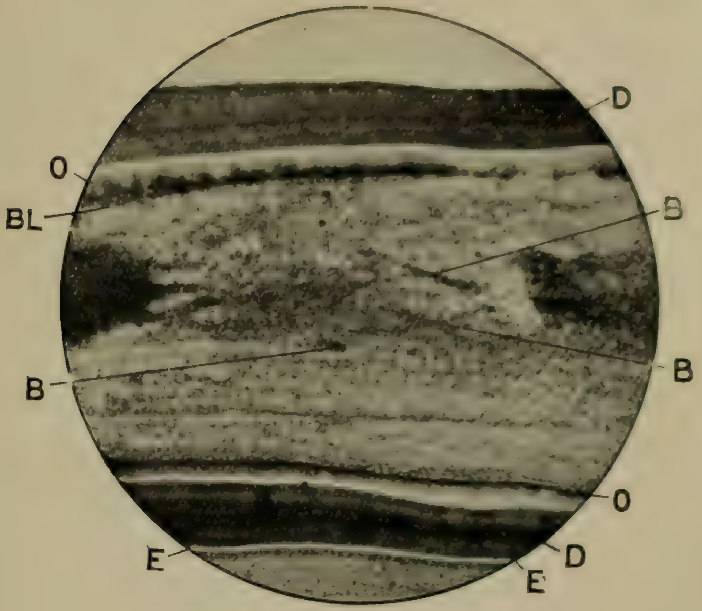

FIG. 1.

Longitudinal section through normal guinea-pig tooth. The pulp is *in situ*. Prepared by decalcification. Stained with Ehrlich's acid hæmotoxylin. Magnified 40 times. D.D., dentine; B.B.B., blood-vessels; O.O., odontoblasts; E.E., enamel.

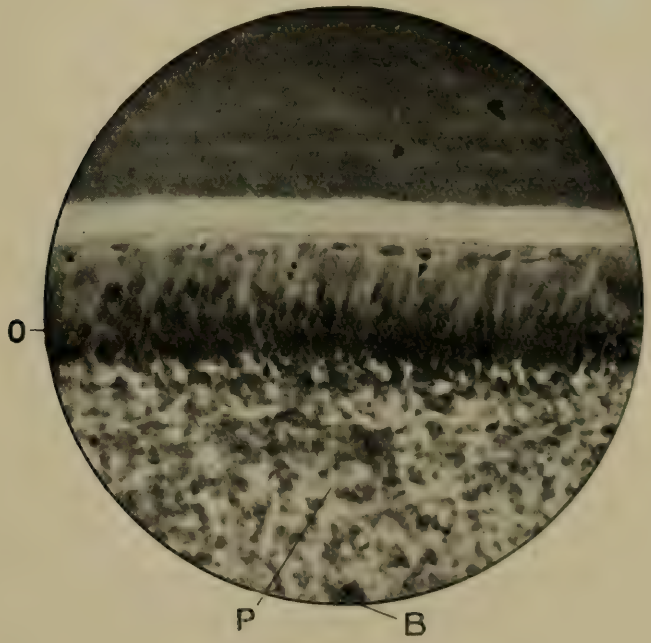

FIG. 2.

Same as preceding figure. Magnified 200 times. O., odontoblasts; P., pulp tissue; B., blood-vessels.

teeth of pregnant guinea-pigs, I placed eight pigs, which were in a more or less advanced state of pregnancy, on a scorbutic diet, to study the biological relation existing between the mother and offspring. Two of the guinea-pigs that were used for this experiment were in the early stages of pregnancy, the remaining six being in an advanced state. The diet given, in each case, consisted of autoclaved milk, oats and bran. The pigs which were in the early stages of pregnancy died on the eleventh and thirteenth day respectively, and death from intestinal infection was suspected. Microscopical sections were made of the embryos of both pigs, but on account of the hæmorrhagic condition and the very early stage of pregnancy, nothing could be discovered. The six pigs that were in an advanced state of pregnancy all dropped their young at various stages of the experiments, from eleven to fifteen days. Microscopical sections were made of the teeth of the mother and offspring and in every case an advanced state of scurvy could be seen.

This work has yet to be carried out more extensively, and hence it is a little premature to make a positive statement, but the indications lead me to believe that during pregnancy guinea-pigs are more susceptible to scurvy than when in a normal condition.

For the past four months I have been working on rickets, but my great difficulty has been to obtain material for histological work. Advanced cases of rickets are not so common now as they were from 1890-95, when artificial feeding of infants was at its height, and when less was known of the contents of artificial foods. To-day if a child enters a hospital and rickets is diagnosed, a cure is brought about in a very short time, consequently material to be had from infants for histological work is very rare indeed. Mr. Sidney Spokes kindly gave me some old specimens and from these I made a great many sections, which lead me to believe there is a great change taking place in the enamel organ. These sections are not sufficiently clear for me to exhibit here, as the material, from the jaw of a child 8 to 9 months old, is very old and the sections I have made are very poor, but the results are sufficient to show that the enamel cells are greatly deranged. Mr. Spokes has lent me his sections which he made from the same specimen when he first obtained it a few years ago and which is exhibit No. 9. This work is to be further developed and I expect within a very short time to have a considerable amount of material to work with. The teeth were all decalcified in a solution containing 40 per cent. formaldehyde, 30 per cent. formic acid, and 20 per cent. distilled water. This is rather a slow process, but I found it gave

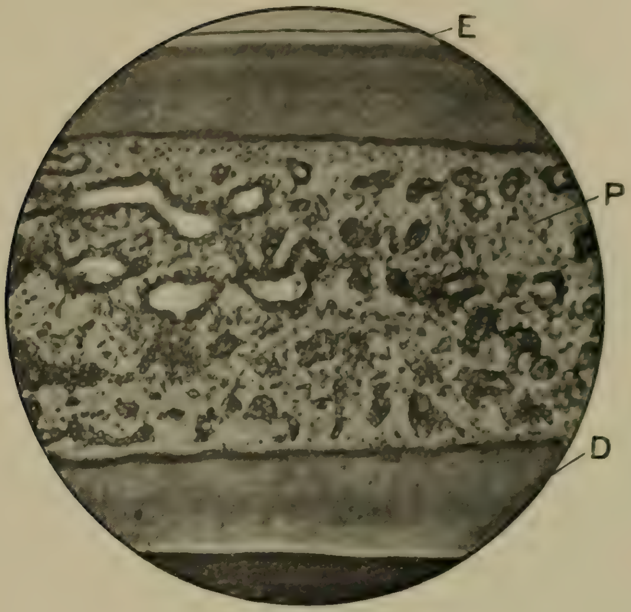

FIG. 3.

A transverse section of the tooth of a guinea-pig kept on a scorbutic diet for about fifteen days. D., dentine; E., enamel; P., pulp tissue proper, showing degenerate condition. Magnified 40 times; stained as in preceding figure.

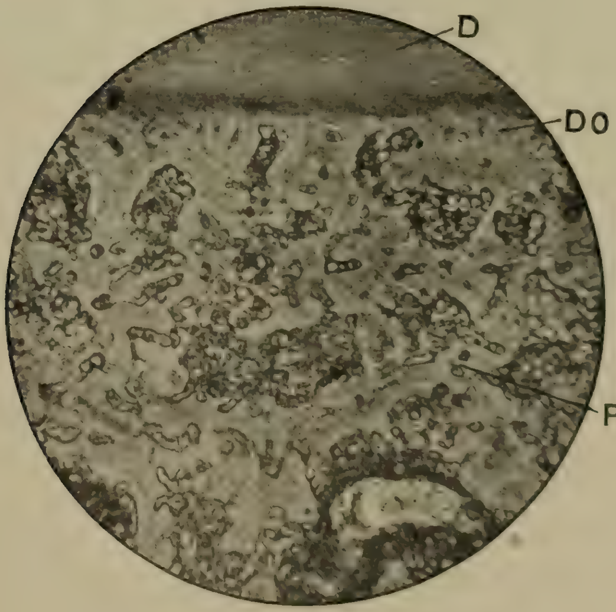

FIG. 4.

Same as fig. 3. Magnified 200 times. Prepared and stained as in preceding figure. D., dentine; D.O., degenerate odontoblasts; P., pulp tissue proper.

better results than the more rapid method. The rapid method which I used was to decalcify with phloroglucin and nitric acid. This process will give very quick results but is not so efficient as the slower method. After the decalcification was complete, sections were cut by freezing in gum and then staining with Ehrlich's acid hæmatoxylin and eosin was carried out.

Throughout the whole of the experimental work the earliest alteration to be noticed takes place first in the odontoblastic cells, in the upper part of the pulp, the decalcification gradually working down to the apex; it is followed by dilatation of the blood-vessels and hæmorrhage.

CONCLUSIONS.

That scurvy does affect the pulp of teeth is indisputable. It is not a theory but an absolute fact, a doctrine in the true sense.

Records that have been made of patients' mouths during the eruption of the second dentition, in regard to the decay of the teeth, must be very unreliable. How many in this room could give a proper record of their diet even for three days, if asked to do so? I venture to say there are very few who could state everything they had eaten for three days, or twelve meals, including tea.

The dentists who are working in infants' and children's hospitals are the most fortunately placed to get reliable information for records that would be of great assistance in studying the development of the first dentition from a dietetic point of view. But this work, like all other medical research, has to be carried out on animal life, if scientific results are to be obtained, and work that is carried on with animals that are always kept in cages and carefully watched and given a certain diet, is bound to give a definite result, if the experiment is repeated often enough. We have used considerably over 100 animals in work on this experiment.

I am obliged to confess that twelve years ago when I published my first article on the effect of artificial light on infants in regard to the calcification of the teeth, I certainly thought that it played a much more important part than the diet. It was while I was arranging my work to carry on research still further with the artificial light that I was attracted by the work that was being done on scurvy in the Lister Institute. After having examined the teeth of several animals that had been fed on a scorbutic diet, I found the pulp of the teeth was affected, even before any clinical symptom appeared in any other part of the system.

To Dr. P. P. Laidlaw, of Guy's Hospital, I wish to express my gratitude for much useful advice and help in the histological work, and to Mr. F. Martin Duncan for the pains and skill taken with the photomicrographs.

DISCUSSION.

Major H. P. PICKERILL: There are several points in Major Wells's paper open to criticism. First, Major Wells has not recorded the conditions of the experiments performed—he showed effects without stating causes or supposed causes. In all experiments on animals it is vital to keep the conditions as free from artificiality as possible. Secondly, there are no means of knowing that the sections shown are all from the same level in corresponding teeth, neither were controls sufficiently shown or insisted upon. In rodents' teeth where pulp degenerations occur normally these are extremely important points. Thirdly, degeneration of the pulp has no bearing whatever upon the problem of immunity to caries: the whole fight takes place at the surface of the enamel and Major Wells, apparently, has not examined the enamel surfaces. Fourthly, I suggest that the whole problem of scurvy is really one of oral toxæmia due to feeding upon salivary depressants. And lastly, I should like to know whether Major Wells has carried out certain control experiments which I suggested to him and his colleagues at the Lister Institute some months ago, because without such controls the value of the work done must be much decreased.

Mr. SIDNEY SPOKES: The interesting work of Major Wells goes to show that in addition to the general symptoms of scurvy and rickets due to a "scorbutic" diet he has found that the pulps of the teeth are affected similarly to the other tissues. An article in the present number of the *British Medical Journal*[1] dealing with rickets occurring in puppies reminds me of a litter I dealt with many years ago when breeding bull-dogs. One was sent to a country butcher and had the advantage of running free and probably also a liberal diet. The others were restricted to a garden and the streets of a town, and although carefully fed with meal, milk, &c., became affected with the marasmic condition alluded to in the article mentioned, and died. The country bull-dog was then brought back in excellent condition but ultimately shared the same fate. The microscope section alluded to by Major Wells is one prepared by the Weil process over twenty years ago from the maxilla of a child eight or nine months old described as rickety. The tip of the temporary incisor is erupting through the gum and the developing permanent incisor is *in situ* in its crypt beneath. I thought that the forming enamel in the latter might show some signs of the hypoplasia which gives rise to the ridges found on such permanent teeth, and in the specimen there are indications of "spaces" in the forming enamel picked out by the infiltration of the perchloride of mercury used in preparing the material. The question of dietetics and of environment in the causation of rickets seems to be still unsettled, but Major Wells's paper is a valuable contribution to the discussion, and his unorthodox remarks on "dental decay" and other points provide material for criticism.

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[1] Paton, D. Noël (and others), *Brit. Med. Journ*. December 7, 1918, p. 625.

Major F. M. WELLS (in reply): First, all the experimental animals were maintained on a scorbutic diet, which consisted of bran, oats and water, or bran, oats and autoclaved milk. Scurvy is so well understood to-day that it can be produced in animals which are kept in cages, by omitting all anti-scorbutics from the diet and the animals can be brought back to normal condition again at will, by administering the accessory food factor that is required. Secondly, the specimens shown were taken from a selection of over ten thousand sections cut, three thousand of which were mounted and examined, and the sections shown of each condition were typical of the results obtained of the pulp throughout. Thirdly, I believe that the pulp has a direct bearing upon the immunity to caries, as I stated in my paper, and it has all to do with the surface of the enamel in regard to the resistance of oral fermentation. Fourthly, the theory relating to scurvy put forward by Major Pickerill is an altogether new one. Lastly, Major Pickerill asked Dr. Zilva, who was carrying out the dietetic work of my experiments, if he would also undertake some experiments with salivary excitants. This was not done, as salivary excitants had no connexion whatever with the work we were doing and I do not believe that they have anything to do with the prevention of decay. This is one of the oldest theories and was promulgated by my father fifty years ago.

Section of Odontology.

President—Mr. G. G. CAMPION, L.D.S.Eng.

Variations in Position of the Teeth in New World Monkeys.[1]

By J. F. COLYER, F.R.C.S., L.D.S.

IN a paper published in the *Dental Record* (January, 1914), attention was drawn to several specimens illustrating variations in position of the teeth in monkeys. Since the appearance of that paper a systematic examination has been made of monkeys in the British Museum, in the Royal College of Surgeons, and in a private collection. The British Museum furnished by far the largest number of specimens, and these with but few exceptions are from animals in the wild state. In all, just over 1,500 specimens have been examined, and the facts gathered are, I think, of sufficient interest to warrant their publication. It is, however, impossible to do justice to the subject in one paper, and I propose to-night to limit my remarks to the monkeys of the New World, which are divided by zoologists into two families: (1) Cebidæ; (2) Hapalidæ. In all 629 adult specimens were examined, those specimens being classed as adult in which the dentition had reached the stage where the third molars and canines were partly erupted.

With these few preliminary remarks we may pass to a detailed account of the variations seen in the different genera.

FAMILY CEBIDÆ.

Genus *Cebus* (the Sapajous or Capuchin Monkeys).

Specimens examined 146.

The typical arch in *Cebus* is shown in fig. 1. In the maxilla the teeth are placed slightly oblique to the line of the arch, and are arranged in a curve, the greatest convexity of which is in the region of the first molar; in the mandible there is a somewhat similar arrangement. The following variations were noted:—

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[1] At a meeting of the Section, held February 24, 1919.

(*a*) Slight crowding of the incisors, two cases[1] being noted in the maxilla and two[2] in the mandible.

(*b*) Slight outward displacement of a right maxillary canine in a male *Cebus leucocephalus*.[3]

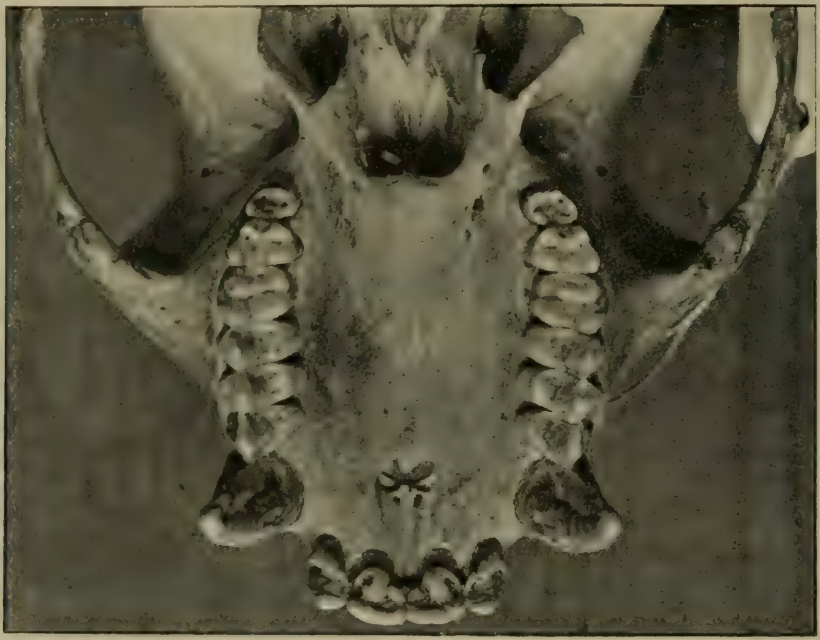

FIG. 1.
Typical arch in *Cebus*.

(*c*) Irregular arrangement of premolars. In *Cebus* the mandibular first premolar is frequently a little oblique to the line of the arch, the distal aspect of the tooth pointing inwards; in two specimens the obliquity was sufficiently marked to constitute a definite irregularity. In four specimens there was an irregular arrangement of the premolars; in one case, a male *Cebus hypoleucus*, fig. 2, both the maxillary and mandibular premolars were crowded. In another specimen, a *Cebus apella*, fig. 3, there was a definite irregularity of the maxillary left first premolar. In this specimen the canine had erupted slightly forward

[1] *Cebus apiculatus* (B.M. 10.11.10.1)[*]; *Cebus fatuellus peruanus* (B.M. 0.11.5.2).

[2] *Cebus* unclassified (B.M. 8h); *Cebus hypoleucus* (R.C.S. Odonto. Series).

[3] B.M. 44.1.18.32.

[*] B.M., abbreviation for British Museum.

and external to the normal position. There was no evidence that the malposition of the premolar was due to persistence of a fragment of a deciduous molar. In two cases the mandibular premolars were crowded.

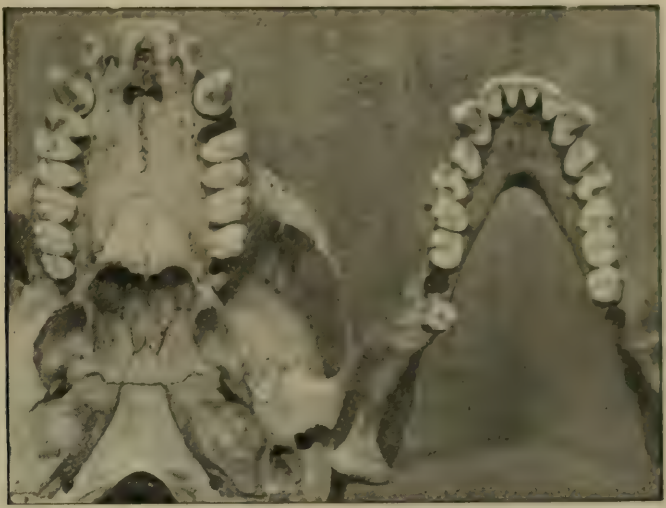

FIG. 2.

Cebus hypoleucus (B.M. 2.3.5.15), from Coiba Island, W. of Panama. This specimen shows a general irregularity of the premolars.

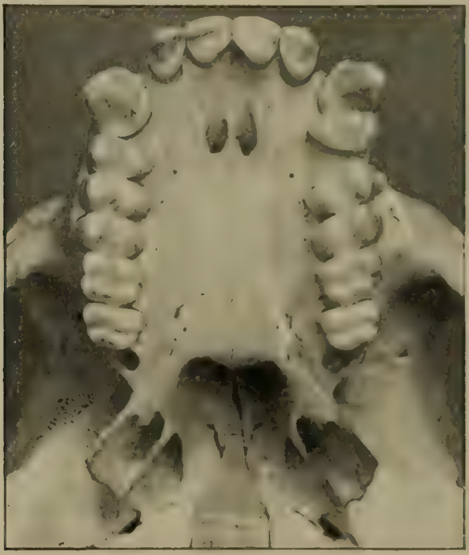

FIG. 3.

Cebus apella, showing a misplaced maxillary left first premolar.

(*d*) In *Cebus* the third molars occlude either edge to edge or the maxillary teeth lie a little internal to the mandibular teeth. The latter condition may be exaggerated, and in four cases one or both of the maxillary teeth occluded well inside the mandibular teeth. In six specimens the second and third molars on one or both sides were placed internal to the arch (fig. 4), three examples being met with in *Cebus apella*. In one specimen, fig. 5, all the molars were placed slightly internal to the line of the premolars.

(*e*) In *Cebus* there would seem to be a tendency for the molars to be rotated. In the normal, as previously stated, the cheek teeth are placed slightly oblique to the line of the arch. This oblique position may be sufficiently increased to constitute a definite irregularity, as shown in fig. 4. Here the third molars are rotated so that the anterior external angles are brought in contact with the distal aspects of the second molars. In one specimen[1] the maxillary right second molar was distinctly rotated, this irregularity being associated with slight crowding of the incisors.

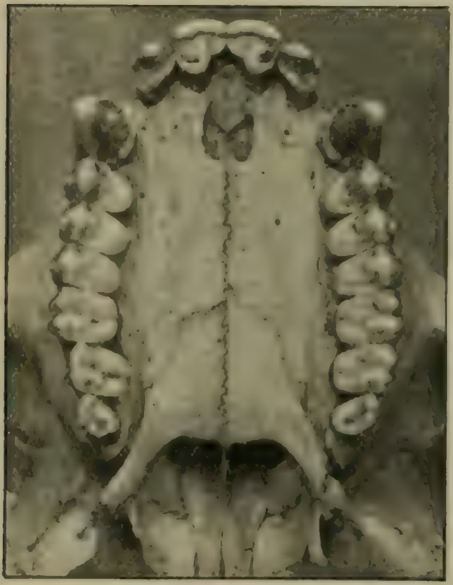

Fig. 4.

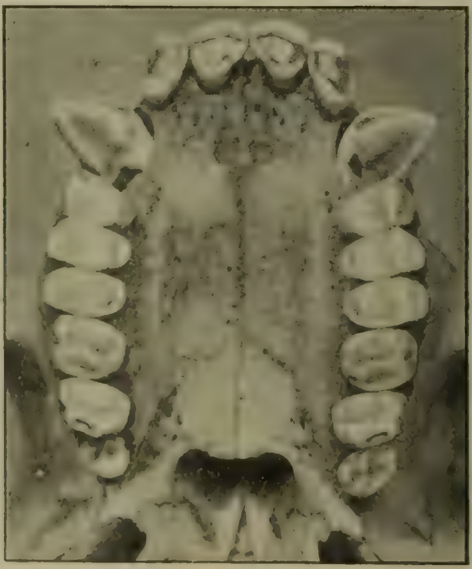

Fig. 5.

Fig. 4.—*Cebus hypoleucus* (B.M. 68.7.9.1). In this specimen the maxillary right second and third molars are placed internal to the line of the arch.

Fig. 5.—*Cebus* unclassified (B.M. 3.9.4.19). In this specimen all the molars are placed internal to the line of the premolars.

(*f*) In three specimens a curious "échelon" arrangement of the molars was present, the teeth being placed with the anterior-external angle slightly inwards as shown in fig. 6.

---

[1] *Cebus fatuellus peruanus* (B.M. 0.11.5.2).

(*g*) In the mandible the third molar is placed with the roots sloping backwards: this backward slope may be increased sufficiently to result in a forward tilting of the tooth. This irregularity was noted in two cases;[1] in one, shown in fig. 7, both third molars were tilted and rotated inwards.

(*h*) In four cases there was slight inferior protrusion, the mandibular incisors occluding in front of the maxillary teeth.

From the above it will be apparent that there is a wide range in the variations in position of the teeth in *Cebus*, the number of specimens showing variation being thirty-six, the majority being in connexion with the molar series.

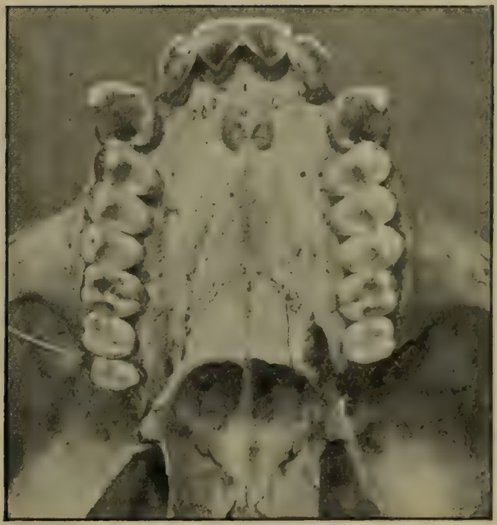

FIG. 6.

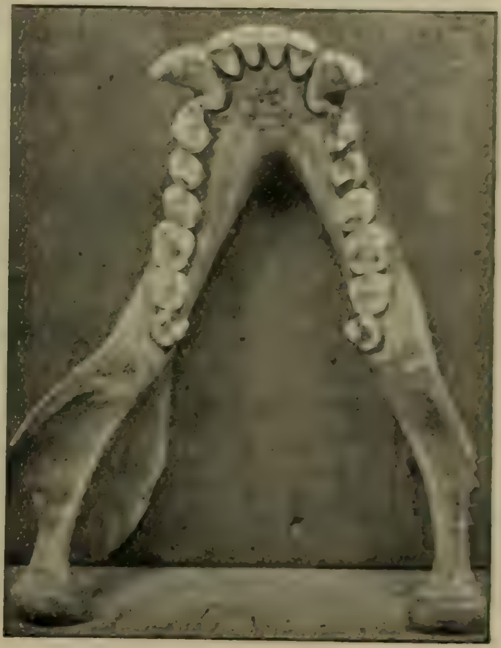

FIG. 7.

Fig. 6.—*Cebus* unclassified (B.M. 5.5.24.2) to show "échelon" arrangement of the maxillary right molars.

Fig. 7.—*Cebus xanthocephalus* (B.M. 49b). The mandibular third molars are tilted and rotated inwards.

In addition to variations in position, five cases of absence of teeth were seen, and in twelve cases the mandibular first premolar was abnormally large, facts which seem to suggest that the genus *Cebus* is in a "changeful mood."

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[1] *Cebus hypoleucus* (B.M. 4.7.6.2); *Cebus xanthocephalus* (B.M. 49b).

Genus *Lagothrix* (the Woolly Monkeys).

Specimens examined 29.

The woolly monkeys, first described by von Humboldt, "take their name from the thick coat of woolly fur which is found beneath the longer hairs."

(1) In this genus five specimens exhibited an irregular arrangement of the premolars. In one, a *Lagothrix Humboldtii*, fig. 8, there was a definite outward displacement of the maxillary left third premolar. In another specimen, fig. 9, the maxillary left third premolar was rotated so that the external aspect looked backwards; on the opposite side of the arch a space was present between the maxillary first molar and third premolar. In a third specimen a *Lagothrix infumatus*, fig. 10, there was a definite asymmetry of the facial bones. On the right side (i) the maxillary canine rested in occlusion over the mandibular first and second premolars; (ii) there was crowding of the premolars; (iii) the third molar was misplaced with the occluding surface looking well backwards. There was a definite cross-bite of the incisors, the mandibular right incisors passing in front of the maxillary teeth. The

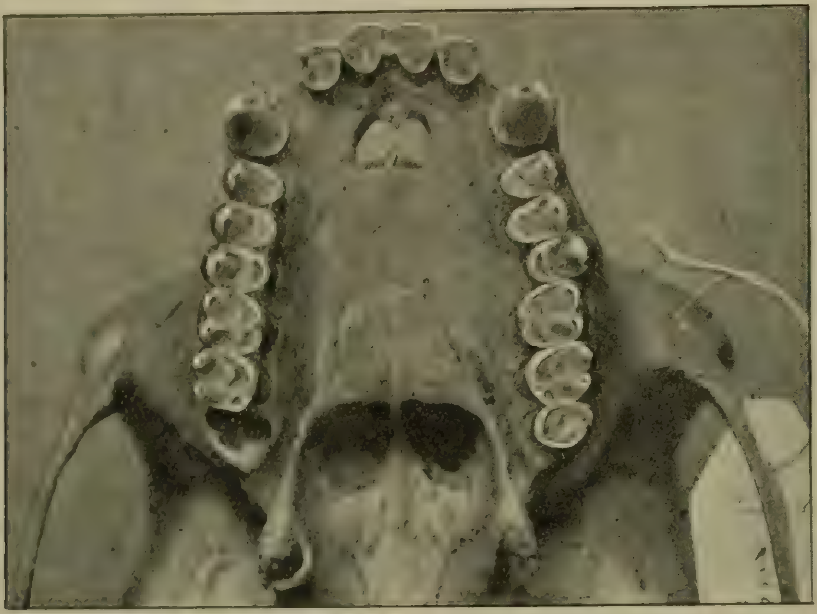

Fig. 8.

Lagothrix Humboldtii (B.M. 95.8.1.4). The maxillary left third premolar is misplaced.

general appearance of the bones suggested an arrest in growth of the right maxilla. Of the two remaining specimens showing irregularity of the premolars, in one,[1] the maxillary first premolars were slightly internal to the arch, and in the other[2] the mandibular first premolars were placed almost transverse to the arch, definite spaces being present between these teeth and the canines.

(2) In one specimen[3] there was an abnormal backward slope of the roots of the maxillary third molars.

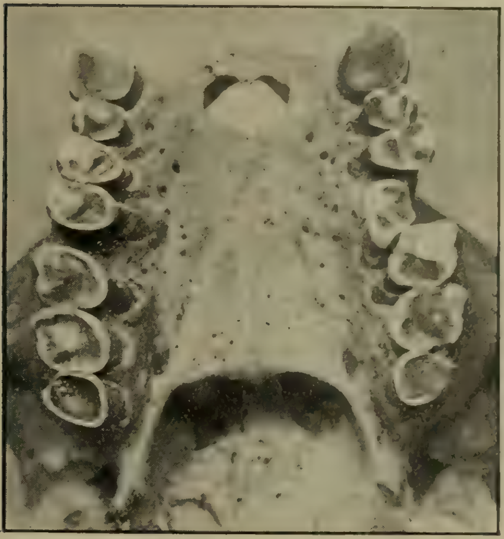

FIG. 9.

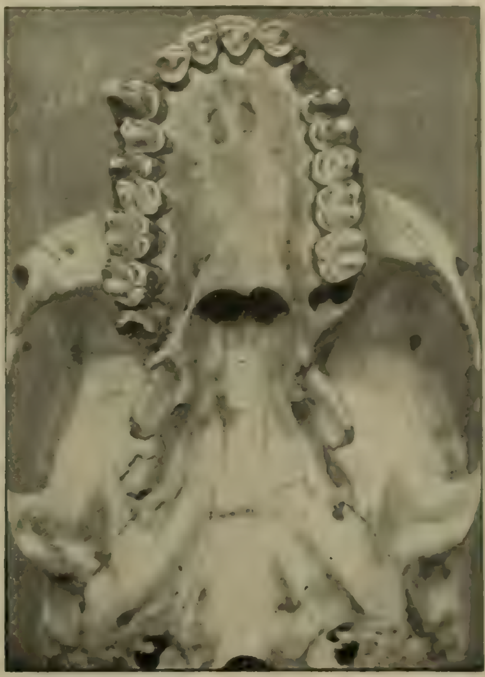

FIG. 10.

Fig. 9.—*Lagothrix* unclassified, from Marcopata (B.M. 0.11.5.15). The maxillary left third premolar is misplaced.

Fig. 10.—*Lagothrix infumatus* from Upper Ucayali (B.M. 66.3.28.7), showing asymmetrical growth of the maxillæ.

(3) In no less than eight specimens the mandibular incisors occluded in front of the upper teeth, a fact which suggests that in this genus there is a definite tendency towards inferior protrusion.

The total number of specimens varying was eleven.

[1] *Lagothrix Humboldtii* (B.M. 43.10.21.12).

[2] *Lagothrix* unclassified (B.M. 11.7.19.1).

[3] *Lagothrix infumatus* (B.M. 57.10.17.10).

Genus *Brachyteles* (the Woolly Spider Monkeys).

Specimens examined 13.

This genus, which is confined to South-east Brazil, forms a kind of connecting link between the *Lagothrix* and the *Ateles.*

(1) The chief interest in this genus lies in the frequency of inferior protrusion. Of the thirteen specimens nine were marked as coming from the Eugenhero River, Esperito Santo. In this group there were seven examples of protrusion of the mandibular incisors; in one the condition was doubtful owing to the post-mortem loss of the incisors, and in one the incisor bite was edge to edge. Of the four specimens not marked as coming from the Eugenhero River, only one showed inferior protrusion.

(2) In one specimen the diastema in the maxilla was absent.

(3) In two specimens there was slight crowding of the mandibular premolars, and in one slight irregularity in the position of the maxillary right first molar and third premolar.

(4) In a *Brachyteles hemidactylus*[1] an additional premolar in the right maxilla had caused the maxillary canine to assume a forward position and the mandibular canine to be misplaced.

The number of specimens varying was eight.

Genus *Ateles* (the Spider Monkey).

Specimens examined 30.

The Ateles or spider monkeys show a remarkable degree of variation.

(*a*) In two cases the presence of extra teeth had led to irregularity of the canines.

(*b*) In a male *Ateles vellerosus*[2] there was marked irregularity of the maxillary premolars (fig. 11). On the left side the third premolar was almost external to the bite, while the canine seemed to be placed more posteriorly than normal. In the mandible a slight space existed on both sides between the first and second premolars.

(*c*) A rare condition was noted in an *Ateles melanochir.*[3] The mandible was distinctly asymmetrical; on the left side the cheek teeth were in normal occlusion; on the right side the mandibular teeth occluded external to their normal position.

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[1] B.M. 45.4.2.7. [2] B.M. 89.12.7.2. [3] B.M. 808a.

(*d*) Amongst other irregularities noted were crowding of the incisors; a slight space between the maxillary left first and second molars; tilting of the mandibular third molar.

The total number of specimens showing variations in position of the teeth was eleven; in two of these extra teeth were present. In three further specimens additional teeth were noted, making a total of fourteen out of thirty specimens showing dental variations. The tendency to vary would appear to be greater in certain species, for example:

In three specimens of *Ateles melanochir*	... ...	2 varied
In four specimens of *Ateles vellerosus*	... ...	3 ,,
In six specimens of *Ateles niger*	... ...	2 ,,

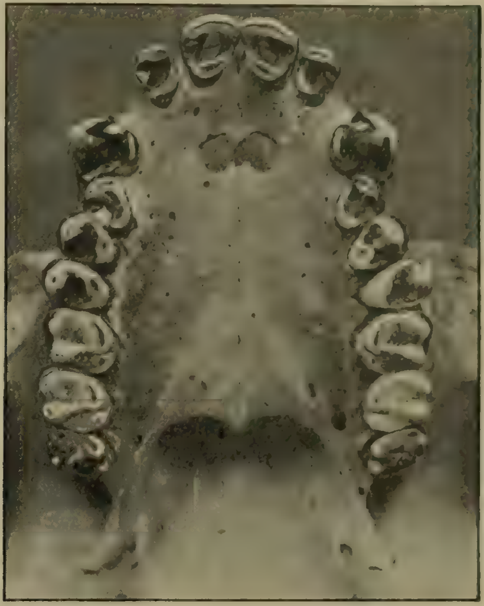

FIG. 11.

Ateles vellerosus (B.M. 89.12.7.2). The maxillary premolars are misplaced.

Genus *Mycetes* (the Howling Monkeys).

Specimens examined 106.

In *Mycetes* the incisors are small compared with the size of the skull and are set in a curve; there is usually a well marked diastema; the premolars and molars are arranged in a straight line, the two sides gradually diverging as they approach the back of the mouth. A typical arch is shown in fig. 12.

The variations seen were as follows:—

(*a*) Slight crowding of the premolars; in three cases both maxillary and mandibular premolars were involved—in four cases only the

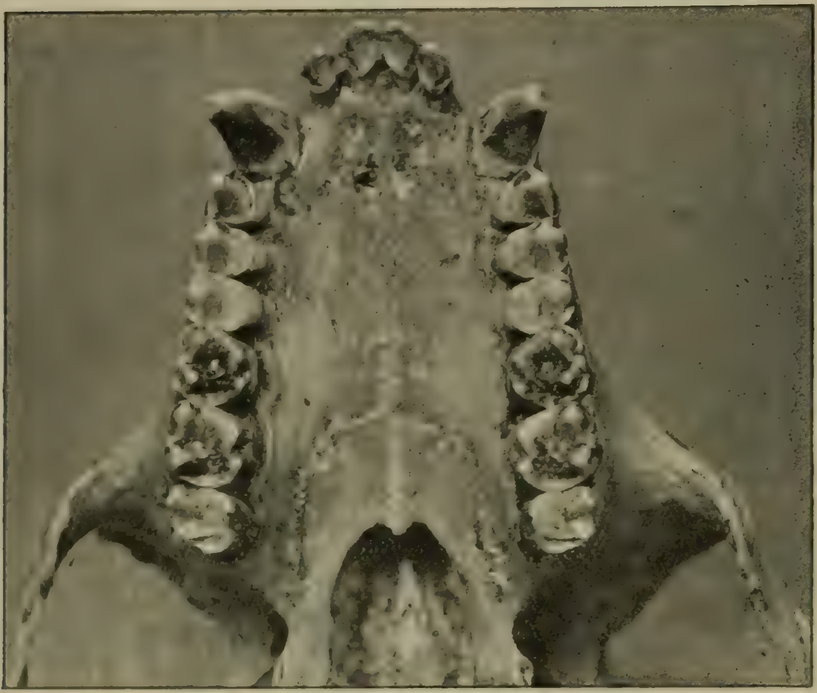

Fig. 12.

Typical arch in *Mycetes*.

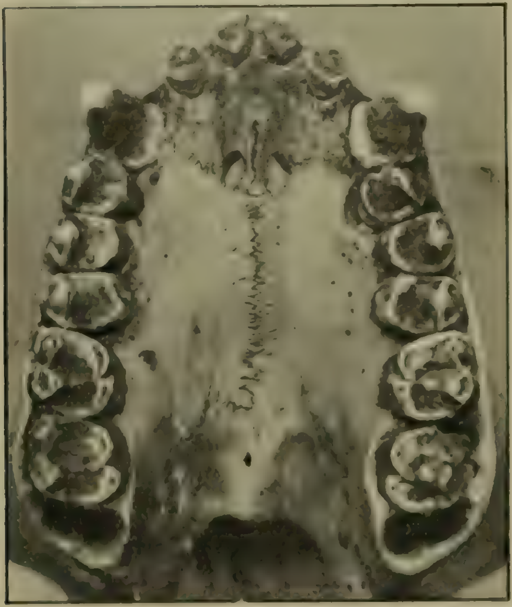

Fig. 13.

Mycetes unclassified (B.M. 51.4.23.1). Showing irregularity in position of the premolars.

maxillary premolars. An example is shown in fig. 13. Three out of the seven cases were in *Mycetes seniculus*.

(*b*) In six specimens a curious arrangement was present, the premolars and molars being arranged in straight lines with the line of the premolars lying internal to that of the molars as seen in fig. 14.

(*c*) In a *Mycetes niger*,[1] fig. 15, the maxillary left first premolar was placed internal to the second premolar; the canine was not present but the condition of the bone suggested that this tooth had been lost from injury, the central incisor was malformed, and it is therefore possible that the irregular position of the premolar in this specimen was due to trauma.

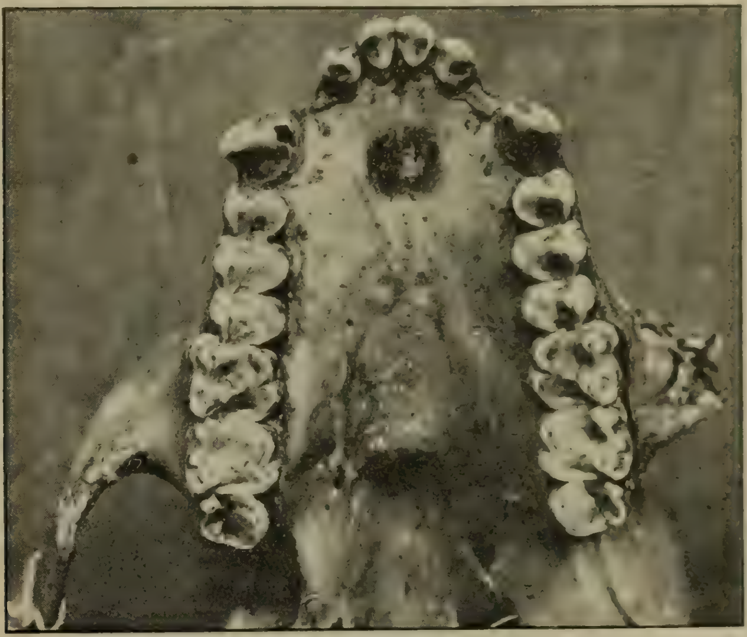

FIG. 14.

Mycetes niger (B.M. 50.9.6.14). In this specimen the premolars are placed internal to the line of the molars.

(*d*) An abnormal spacing of the teeth was present in six specimens. In one case there was a marked space between the maxillary central incisors; in three cases spaces were present between the central and lateral incisors in both the maxilla and the mandible; in one case spaces existed between the mandibular second and third premolars, in one case definite spaces were present between the maxillary third premolars and first molars, the mandibular third premolars in this specimen being transverse to the arch.

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[1] B.M. 51.8.12.8.

(*e*) Rotation of the mandibular third molars. In five cases the antero-internal angle was rotated inwards; in one case the antero-external angle was rotated outwards. It is of interest to note that five out of the six specimens belonged to the species *Mycetes palliata.*

(*f*) Protrusion of the mandibular teeth was present in forty-five cases. The various species show a different degree of variation in this direction, for example :—

Species	Number examined	Number showing inferior protrusion
Mycetes palliata	20	12
Mycetes Macconnelli	4	3
Mycetes ursina	11	1

(*g*) The diastema in the maxilla was absent in two cases.

The total variations noted were forty-four.

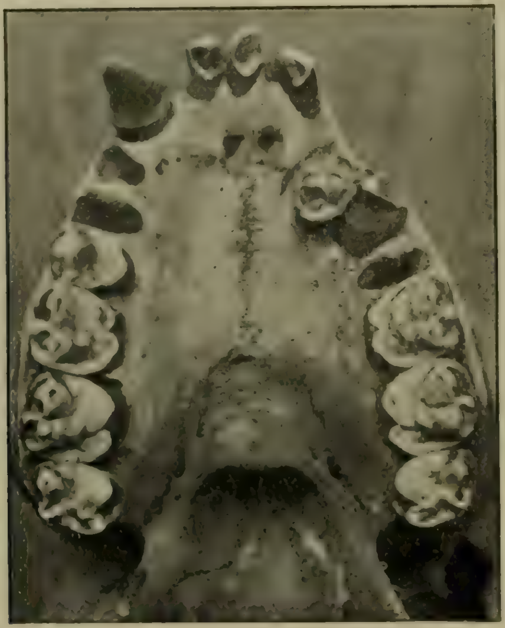

Fig. 15.

Mycetes niger (B.M. 51.8.12.8). Showing irregular position of the maxillary left first premolar.

Genus *Chrysothrix* (the Squirrel Monkeys).

Specimens examined 52.

In this genus only three variations were present, as follows :—

(*a*) Irregular position of both maxillary and mandibular premolars.

(*b*) Irregular position of mandibular premolars; the maxilla being too defective to obtain reliable data.

(*c*) Irregular position of the maxillary right canine in a *Chrysothrix sciureus*[1] from the Coast Region, Demerara, fig. 16.

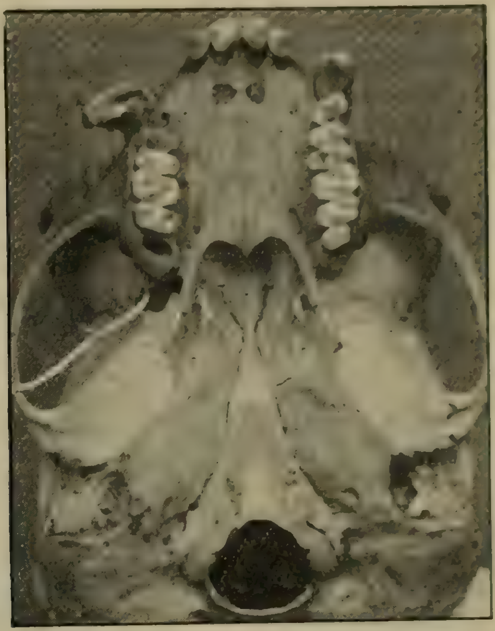

FIG. 16.

Chrysothrix sciureus (B.M. 8.3.7.14). The maxillary right canine is misplaced.

Genus *Callithrix* (the Titi Monkeys).

Specimens examined 40.

In this genus the incisors are set in a well marked curve; the canines are not so well developed as in many of the monkeys and are separated from the lateral incisors by a small diastema, which is often entirely absent. The premolars and first molars run backwards and outwards, the second and third molars turning slightly inwards. The arch approximates in character that seen in man. The following variations were noted:—

(*a*) Irregularity in position of the incisors. When the teeth are in occlusion the maxillary incisors are often a little in advance of the mandibular teeth, but there is a tendency for the maxillary lateral incisors to be placed slightly internal to the arch, and in some cases to be overlapped by the distal edge of the mandibular teeth, or to lie in the space between the mandibular lateral incisors and canines. This inward position of the maxillary lateral incisors may be so marked as to constitute an irregularity. An example of crowding of the mandibular incisors was noted in *Callithrix gigot*[1] and in two specimens spaces existed between the mandibular incisors.

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[1] B.M. 8.3.7.14.

(*b*) Irregularity in position of the premolars. In one case the mandibular left canine and premolars were misplaced, the maxillary right premolars were internal to the line of the molars and the lateral incisors were slightly internal to the arch.

(*c*) Inferior protrusion was present in only one specimen (*Callithrix caligatus*).[2]

The number of specimens showing variations was ten.

Genus *Nyctipithecus* (the Nocturnal Owl-faced Monkeys).

Specimens examined 35.

Variations were noticed in two specimens, as follows:—

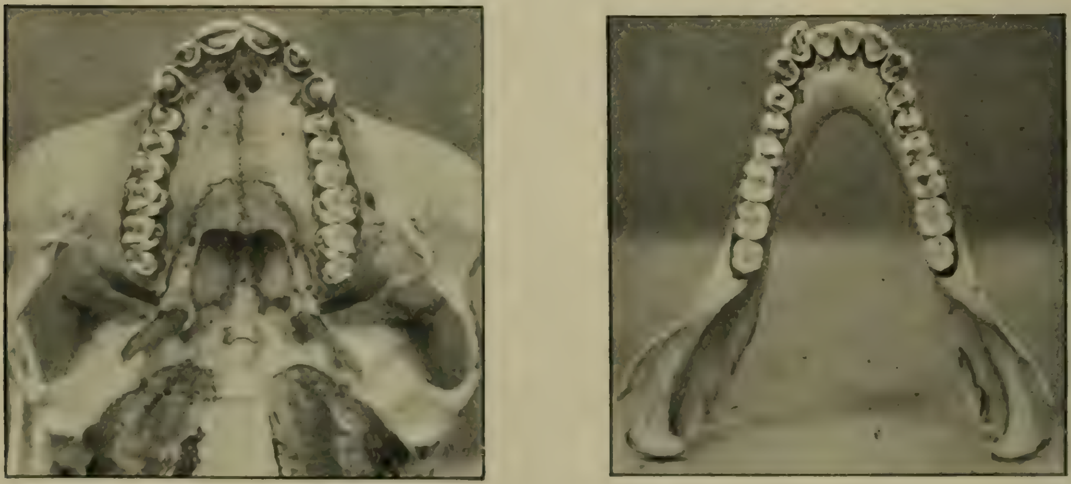

FIG. 17 (i). FIG. 17 (ii).

Nyctipithecus unclassified (B.M. 14.4.25.30). Showing irregularity in position of the maxillary and mandibular incisors.

(*a*) Slight overlapping of the maxillary central incisors with the mandibular left incisor in advance of the corresponding tooth in the maxilla.[3]

(*b*) Slight crowding of the maxillary premolars.[4]

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[1] B.M. 3.9.5.7.

[2] B.M. 8.5.9.8.

[3] *Nyctipithecus* unclassified (B.M. 14.4.25.30).

[4] *Nyctipithecus trivergatus* (B.M. 2.2.1.9).

Genus *Brachyurus* (the Oukari Monkeys).

In the eleven specimens examined, the arrangement of the teeth was normal.

Genus *Pithecia* (the Saki Monkeys).

In *Pithecia* the maxillary incisors are set in a sharp curve; there is a wide diastema, with the canines placed at the corner of the arch. The line of the cheek teeth commences slightly internal to the canine and follows a direction slightly inwards and then outwards. Insufficient space in the region of the premolars results in the second and third premolars being pushed inwards to the arch, a condition noted in four specimens.

The only other irregularity noted was in *Pithecia chiropotes*,[1] in which the maxillary first premolars were transverse to the arch instead of oblique, as in the normal.

FAMILY HAPALIDÆ.

Genus *Midas* (the Long-tusked Marmosets or Tamarins).

Specimens examined 84.

In this genus five specimens showed variations in position of the teeth; in four of these the irregularity was only slight but in one a

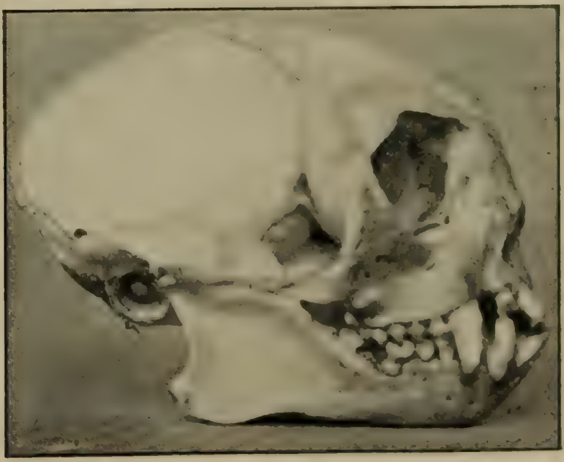

Fig. 18.

Midas (B.M. 0.7.7.2).

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[1] B.M. 8.3.7.6.

remarkable condition was present. This skull was marked as coming from the Perene River and is shown in fig. 18.

The mandibular right canine strikes the labial aspect of the maxillary lateral incisor; the mandibular incisors are pushed over to the left side; the maxillary right canine in occlusion lies over the mandibular first and second premolars; the teeth in the right half of the mandible, with the exception of the second molars, are in abnormal occlusion.

Genus *Hapale*.

Specimens examined 43.

Three specimens showed variation; in one the incisors were crowded, in a second the mandibular premolars were irregular, and in a third a space existed between the maxillary central and lateral incisors on both sides, the mandibular lateral incisors having grown up into the spaces.

The following table gives the number of variations in the position of the teeth in the various genera :—

VARIATIONS IN THE POSITION OF TEETH IN NEW WORLD MONKEYS.

	Number examined	Variations other than inferior protrusion	Number showing inferior protrusion	Total number varying
Family Cebidæ.				
Cebus	146	34	3	36
Lagothrix	29	6	8	11
Brachyteles	13	5	8	8
Ateles	30	11	0	11
Mycetes	106	28	25	44
Chrysothrix	52	3	0	3
Callithrix	40	9	1	10
Nyctipithecus	35	2	0	2
Brachyurus	11	0	0	0
Pithecia	40	5	0	5
	502	103	45	130
Family Hapalidæ.				
Midas	84	5	0	5
Hapale	43	3	0	3
	127	8	0	8

The points to be noted are :—

(1) The degree of variation in the Cebidæ compared with the Hapalidæ.

(2) The degree of variation in the various genera of Cebidæ.

No. 12

Section of Odontology.

President—Mr. G. G. CAMPION, L.D.S.Eng.

Bone-grafting in Gunshot Fractures of the Jaw.[1]

By WILLIAM BILLINGTON, M.S., F.R.C.S., Captain R.A.M.C.(T.),
ARTHUR H. PARROTT, M.D.S., L.D.S.
AND
HAROLD ROUND, M.D.S., L.D.S.

FOR rather more than two years we have had charge of the "Jaw Department" at the First Southern General Hospital, Birmingham, to which all cases of injuries to the jaws requiring special treatment are sent from the whole Southern Command. A very large percentage of these cases suffer from compound fracture of the mandible. Successful treatment involves (1) osseous union, (2) functional occlusion, and (3) avoidance of disfigurement.

In the majority of cases these results have been obtained by means of mechanical technique associated with due regard to the establishment of aseptic conditions. A certain number of cases, however, present difficulties which cannot be overcome by this technique alone: such treatment, whilst serving to secure alignment, may fail to produce osseous union, owing to one or more of the following causes:—

(1) Extensive loss of bone as the direct result of the injury, resulting in the formation between the fragments of fibrous tissue only.

(2) Persistent sepsis accompanied by necrosis and loss of bone tissue, due to the injury being compound either to the interior or the exterior of the oral cavity, with or without the presence of foreign bodies or sequestra.

(3) Intervention of soft tissues between fragments.

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[1] At a meeting of the Section, held January 27, 1919.

(4) Separation of fragments in the endeavour to restore alignment, particularly in cases where spaces of ½ in. or less are present.

(5) Over-riding or malposition of osseous fragments.

(6) Persistent mobility of fragments due to muscular action, in some cases uncontrollable by mechanical means—such as short posterior edentulous fragments.

For convenience of consideration, these ununited fractures may be classified according to position, thus :—

(1) Anterior area, between the canines.

(2) Lateral area, between the canine and the last molar (inclusive).

(3) Posterior area, behind the last molar.

(1) *Anterior Fractures.*—Delayed union in this region may now be considered rare, but it does occur. Where the loss of tissue is not considerable the case is handed over for surgical treatment. In some cases removal of intervening fibrous tissue and freshening of the ends of the fragments, with subsequent approximation and fixation with dental splints, may suffice. But, in cases in which it is doubtful whether a good result can be obtained by such means or only by approximation of fragments with loss of alignment and resulting deformity, we have come to regard bone-grafting, with restoration of alignment, as a preferable procedure.

(2) *Lateral Fractures.*—In this class of injury displacement of fragments occurs more frequently and to a greater extent than in anterior fractures, this being due primarily to unbalanced muscular action. For this reason ununited lateral fractures are more common than anterior. Once a bone-graft has been decided upon as necessary, every effort is made to restore the fragments to alignment as near the normal as possible, both for ultimate restoration of function and for æsthetic reasons. The dental arch usually provides a sure guide to this, and interdental splints of various types are the direct means of obtaining restoration of position. When this is satisfactorily accomplished, retention is maintained for at least a month after all soft parts are fully healed, and evidence of sepsis has disappeared. Then we usually consider the case ready for operation; the splints are removed and the same, or new splints, are applied after the grafting operation, and when the wound is healed.

(3) *Posterior Fractures.*—In this region we are confronted with one of the most difficult problems which jaw injuries present to dental technique, that is the edentulous posterior fragment. This edentulous fragment which is severely displaced generally upwards,

forwards and inwards, is irreducible by the application of any internal mechanical appliance, owing to the intolerance of the soft tissues to pressure. This intolerance, due largely to muscular movement, is further aggravated by the presence of sharp edges or spurs of bone projecting at the parts where pressure is required to depress the fragment. The difficulty of satisfactorily reducing and retaining such displaced fragments has been made apparent to us in our earlier efforts when using a variety of mechanical devices (soft rubber pads with springs, hinges, levers, &c.). The result of this line of treatment has led us to abandon such attempts at fixation as being liable to cause serious and prolonged discomfort to the patient with little or no practical gain in the prospect of obtaining osseous union. Our present view is that it is better to leave these fragments uncontrolled until the time for surgical interference has arrived; the displacement is then largely reduced by release of muscular or fibrous attachments, to which it may be due. Projections of bone liable to cause discomfort beneath any covering splint subsequently applied are removed at the same time. This method of procedure has shown that posterior fragments surgically treated in this manner will retain their restored alignment in contact with the graft inserted long enough to enable the graft to heal in. This permits of the adaptation and fixation of the most suitable splints for retaining the restored alignment.

DENTAL TECHNIQUE.

The advantages of allowing free access to the mouth during operation, both for the surgeon and the anæsthetist, and for efficient treatment in the event of any post-anæsthetic complication arising being kept in view, the principles of dental technique adopted in all three classes of fractures—anterior, lateral, and posterior—are the same and may be given as follows:—

(1) Removal of all sources of sepsis.

(2) Reduction of misplaced fragments to normal position as far as mechanically practicable, without detriment to condition of soft tissues.

(3) Removal of all appliances before the grafting operation is done, no appliances being adapted until the operative wound is closed and the graft is healed in sufficiently to avoid all risk of sepsis or disturbance, a period varying from two to four weeks or even longer, according to the amount of displacement corrected (surgically) at the time of operation, condition of the patient, &c. Naturally, the greater the reduction, the

greater will be the intolerance of the tissues to pressure from dental splints. We consider that in some earlier cases the nutrition of the graft and its bed may have been interfered with by the pressure from splints applied too early.

(4) *Re-adaptation of Splints.*—New models are taken and splints made for the retention of all parts in the alignment gained by the operation. Where any slight alteration of the occlusion attained before operation has resulted from the insertion of the graft or the reduction of a fragment, such deviation has been found readily reducible by a suitable method of splinting without interfering with the retention of the bone graft in a position favourable to union. That this can be done is due to the fact that the graft is firmly held *in situ* by the deep layer of soft tissues and the ends of the graft and the fragments being so bevelled and overlapped as to allow a certain amount of movement without loss of contact, as described later. The correction and retention of the fragments are attained by the use of cast silver cap splints, adapted and cemented to standing teeth, supplemented by vulcanite extensions with soft rubber lining covering edentulous parts in the neighbourhood of the graft. Where interdental splints are used, the position of the closed bite is resorted to and the splints are fixed to each other by means of articulating tubes and bolts, hooks and wires, &c. If a satisfactory articulation can be assured, it has been found quite sufficient to splint the mandible only. As such treatment restores function, it is naturally a comfort, and an aid to the patient's recovery. A metal chin cap splint of standard type covered with lint or chamois leather is applied in all cases as soon as the wound has healed.

We are of the opinion that no effort should be spared in the way of bringing the physical and mental condition of the patients to the highest possible standard of efficiency, before and after the operation of bone-grafting, by means of healthy surroundings, good feeding and plenty of outdoor exercise. Massage and ionization have proved useful adjuncts in the treatment of soft tissues, both before and after operation. In a few cases, even twelve months after the union of a bone-graft, we have found evidence of a rarefying osteitis around the apices of teeth ; these were obviously considered at the time of the operation to be so far removed from the seat of the graft as to cause no anxiety. Such a fact raises the doubt as to whether the extraction of one tooth on each side of the gap leaves sufficient margin for safety.

SURGICAL TECHNIQUE.

It is essential that firm osseous union should be obtained even at the expense of deformity, otherwise the power of mastication is gravely impaired. When, however, the gap is wide, the deformity resulting from allowing the fragments to approximate is so great and renders the fitting of suitable dentures so difficult that it can only be the extreme resort. A satisfactory functional and cosmetic result can then alone be obtained by successfully bridging the gap by means of a bone-graft.

Other classes of cases in which surgical assistance is necessary to secure osseous union are those (1) in which there is overriding or malposition of osseous fragments; (2) when mobility of the fragments from muscular action cannot be prevented by mechanical means—for example, short posterior edentulous fragments. Operation in these cases consists in carefully dissecting away the scar tissue from between and around the ends of the fragments, rectifying the deformity by the division of contracted muscular attachments and fibrous bands, and immobilizing the fragments by means of a plate and screws. If, as is often the case, a gap remains between the fragments when pared and brought into correct alignment, a small graft is introduced; the technique is similar to that described for bone-grafting.

Bone-grafting in fractures of the jaw resulting from war injuries has presented many difficulties. At first success was so rarely obtained, that the attempt was given up and discouraged by highly competent surgeons as not being worth while. The alternative of obtaining union by allowing the fragments to approximate led to so much disfigurement, and the resulting configuration of the alveolar margin when the gap was a wide one rendered the adaptation of satisfactory dentures so difficult, that we felt compelled to persevere; especially was this so, because in spite of sacrificing normal alignment, osseous union could not be obtained in a definite percentage of cases. To discharge such cases with non-union was a confession of failure that could only be made with extreme reluctance.

The technique we now employ has been reached only after much experiment, many devices having had to be abandoned. Without enumerating the various stages through which we have passed, we think that a short account of the preparation for and the performance of the operation now in use will be helpful. Whereas success was the exception two years ago, it is now the rule, and it rarely happens that the graft fails to consolidate.

Preliminary Preparation.—This is prolonged, and it may be many months after the original wound was received, before the operation of bone-grafting can be undertaken. The fracture is always complicated by sepsis, usually severe, and often by extensive injury to the surrounding soft tissues. As soon as possible an X-ray examination should be made, after which the patient should be anæsthetized and the wound explored. Foreign bodies, teeth situated in and adjacent to the fracture, and loose fragments of bone should be removed. Larger fragments of bone with reasonably good attachments to soft tissues may be left in the hope that they will live. At the same time it is often possible to carry out some preparatory plastic work, the fragments of bone being replaced in as normal a position as possible and soft tissues being drawn together. Within the mouth care must be taken to provide efficient drainage and access to raw surfaces. Finally, before attempting to bone-graft, it is very important that dribbling of saliva from the mouth should be prevented by plastic operations. This dribbling is very common where there is a defect in the lower lip, and saliva soaking into the dressings greatly increases the risk of sepsis in the operation wound. After all wounds inside and outside the mouth have healed, an interval of from four to six weeks should elapse before the bone-grafting operation is performed. During this period the patient is usually sent to a convalescent hospital. Immediately before the operation all dental fixation splints are removed from the mouth. It is found that the retention of these militates against the success of the operation. They cause risk from post-anæsthetic vomiting, greatly adding to the discomfort of the patient, and, where pressure is exerted by them in or near the operation area, they increase the risk of sepsis. For these reasons no attempt is made to fix the fragments of the jaw during the operation or for at least a fortnight after. Everything which interferes with prompt "healing in" of the graft must be discarded.

OPERATION.

A skilled anæsthetist is essential, and we owe much to the skill with which Captain McCardie has maintained successful anæsthesia under very difficult conditions.

A curved incision is made in the neck beginning 1 in. behind the extremity of the posterior fragment and ending 1 in. in front of the end of the anterior fragment. The incision commences and finishes about ½ in. above the line of the lower border of the jaw and in the neck runs about 1 in. below that line. It is only by carrying the incision well below the jaw and raising a flap that soft tissue sufficient to envelop the graft satisfactorily can be obtained. Often at the site of the fracture there is nothing but dense scar tissue extending through to the mouth. In splitting this great care must be taken to avoid opening into the mouth, an accident which necessitates postponement of the operation. The unsatisfactory bed provided by this scar tissue constitutes one of the difficulties of bone-grafting.

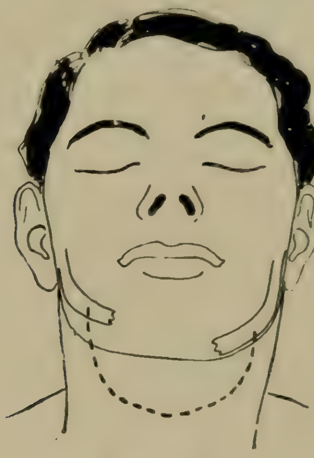

Fig. 1.

The incision is deepened by cutting upwards and inwards until the lower border of each fragment is reached: the soft tissues covering their outer surfaces are then raised for an inch away from the gap and turned up in the flap. The ends of the fragments and the fibrous tissue occupying the space between them are now carefully cut away; finally, each fragment is bevelled by cutting away a flake of bone from its outer surface with bone forceps. In this way raw bone is exposed on either side of the gap and on the outer aspect of the fragments for about 1 in. from its extremity. All bleeding is then carefully arrested and the bone-graft prepared.

After experimenting with bone from the ribs, the tibia, and from the mandible itself, the iliac crest was finally selected as the site from which to take the graft. The bone is tough and can be cut with bone forceps without splitting. Further, a graft can easily be obtained of any length or breadth and the slight natural curve of the crest is approximately that of the mandible. The graft should be taken preferably from the same side as that of the operation wound; this allows the patient to lie comfortably on the opposite side.

An incision is made over the crest, commencing at the anterior superior spine and extending as far back as required. The muscles are then separated on either side of the crest and pressed back by retractors. The bone is cut by an ordinary Horsley's hand saw. The graft should be 2 in. longer than the gap to be filled. If a more curved piece of bone is required, for example, to fill a space near the chin, the graft is made to include the bone between the superior and inferior spines. In this way a graft 4 in. long has been obtained to fill a gap extending from the angle of the mandible on one side to considerably beyond the chin on the other; the natural curve was so accurate that no subsequent modelling was needed.

After removal of the bone the muscles detached from it are sewn together with catgut and the wounds closed. No inconvenience whatever seems to result. The ends of the graft are now bevelled with bone forceps, the bevelled areas lying on the prepared outer surfaces of the jaw fragments. In this way the graft overlaps the gap at each end for an inch. Two advantages result from this: (1) A broad line of bony contact between the graft and the fragments is provided with increased prospect of speedy firm osseous union, and (2) there is practically no risk of separation in the event of the gap being increased by subsequent manipulations during the application of dental splints, as a certain amount of sliding can take place without contact being lost.

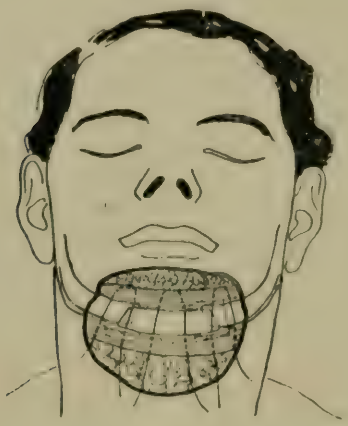

Fig. 2.

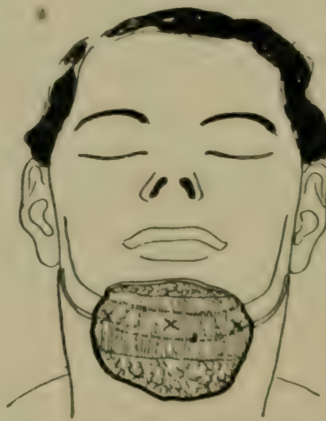

Fig. 3.

No attempt is made to fix graft or fragments by plates and screws, by wiring, or even by dovetailing the graft into the fragments. All these measures have been tried and discarded. The presence of foreign bodies greatly militates against successful healing, a sinus down to the plate or wire almost invariably forming. Attempts also to make the graft act as a splint by dovetailing it between the fragments have not led to satisfactory results.

Our practice now is to keep the graft in place by sewing the soft tissues closely over the graft and the ends of the fragments by hardened catgut. This has the additional advantage of closely surrounding the graft with living vascular tissue and abolishing dead spaces in which blood-clot and serum can collect. This improves the nutrition of the graft and diminishes the risk of sepsis.

Finally, the skin is approximated with a few interrupted stitches. No drainage is employed beyond that of leaving spaces between the skin sutures to allow of the escape of serum. A simple dressing and bandage is applied and the patient sent back to bed.

No attempt is made to reintroduce dental fixation splints until the wound is firmly healed and the compound fracture has been converted into a simple one. This usually occurs in two weeks, after which the case is treated as one of simple fracture of the jaw. Firm osseous union occurs in from two to four months, but it is inadvisable to fit the final dentures until at least four months have elapsed, and it is perhaps wiser to allow an interval of six months.

During the nine months, October, 1917, to July, 1918, 25 bone-grafts were done; in 11 of these cases the graft was taken from the tibia, and in 14 from the ilium. In this series the results obtained were as follows: In 17 cases good bony union was established. In 6 cases union had taken place at one end only (all these have had the ununited ends freshened and splints refixed, and in one or two cases small pedicle grafts were done); in 1 case the graft healed in well but there was no union at either end; in 1 case the graft came away altogether.

From October, 1918, to December, 1918, 9 bone grafts were done, 8 of which were taken from the ilium and 1 from the tibia. In this second series the results obtained so far (beginning of January, 1919) are as follows: In 1 case union is practically established; in 6 cases the graft healed in well, and shows satisfactory progress; in 2 cases there was a little discharge from the wound for a short time.

In order to illustrate these results we have selected 6 cases from these two series for publication.

Case I.—Private A., aged 22, wounded by shrapnel on January 14, 1917; admitted on February 2, 1917. Extensive damage to left horizontal ramus, with comminution and loss of bone. Suppuration severe. Wound cleaned up and splints applied to correct severe displacement. On June 20, 1917, a final sequestrum was removed under general anæsthesia and cap splints again fixed, the patient being sent home on leave. In March, 1918, fibrous union, only, was found, with much muscular movement of posterior fragment (edentulous), and on May 27 a bone-grafting operation was performed, a graft 2 in. long being taken from the tibia. The graft healed in and the splints were again fixed on July 13, 1918 (metal cap splints with vulcanite extension). On December 30, 1918, splints were removed, osseous union being well established. Dentures were supplied and the patient was discharged on January 31, 1919 (*see* figs. 4-6).

Case II.—Private B., aged 34, wounded by shrapnel on September 27, 1917; admitted on October 11, 1917. Deep septic wound ($2\frac{1}{2}$ in. in diameter) of left cheek, fracture (comminuted) of left horizontal ramus, open to oral cavity. Teeth loose; speech deficient. General condition good. The loose teeth were removed with sequestra and the wound cleaned up well. On October 27, 1917, cap splints were fitted, restoring alignment, with lever extension on to the left posterior fragment. On November 15, 1917, further sequestra were removed from the left posterior fragment. Extension was made in vulcanite splint and the patient sent on leave. On April 4, 1918, as fibrous union only was established, bone-graft was decided upon. A tibial graft 3 in. long was inserted on July 15, 1918. Splints with vulcanite extension were fitted on July 30, 1918, a graft having healed in. On October 10, 1918, firm union was demonstrated, both by X-ray and clinically. Dentures were inserted on October 29, 1918, and the patient subsequently discharged; masticating power good on the right, and fair on the grafted side. Scar much improved and disfigurement slight (*see* figs. 7, 8).

Case III.—Lance-Corporal E., aged 26, wounded by shrapnel on October 11, 1917; admitted on December 14, 1917. There was an extensive lacerated wound of the whole of the chin and both sides of the neck and almost entire loss of bone in the region between the two lower first molars. This patient had received treatment in France and when admitted there was a temporary splint in position capping the two last molars on each side, and preventing convergence of right and left fragments. Some time elapsed before the parts were in a condition for bone-grafting to be attempted and finally only one tooth, the last molar on the left side, was allowed to remain. A bone-graft was attempted on July 29, 1918, but a small opening was made into the mouth and the attempt abandoned. A second attempt was made on December 2, 1918, when a graft taken from the ilium and measuring 5 in. in length was inserted into the gap. This graft was allowed to heal in well; the bed for the graft was a very poor one owing to excessive scarring, and splints were not fitted in position until January 5, 1919. These splints consisted of metal caps covering the upper teeth and the one molar on the left fragment—with soft rubber lined vulcanite extensions, the whole being fixed by means of articulating tubes and bolts. The present condition is excellent and consolidation is apparently taking place (*see* figs. 9, 10).

Case IV.—Lance-Corporal R., aged 31, wounded by shrapnel on June 23, 1917. Admitted on August 9, 1917. There was an extensive lacerated wound of the whole of chin, neck and lower lip, and almost entire loss of bone in region between $\overline{5}|$ and $|6$. This patient had received treatment in France and when admitted was wearing a loose vulcanite splint capping the remaining teeth in the mandible. A bone-graft 3½ in. in length taken from the ilium was inserted on April 26, 1918. This healed in well and splints (metal caps with vulcanite extensions, articulating tubes and bolts) were fixed on June 5, 1918. Good progress was made and the splints were removed on January 13, 1919, when good bony union was found to be established. Dentures were fitted and the patient discharged (*see* figs. 11, 12).

Case V.—Corporal J., aged 29. Wounded by shrapnel on October 5, 1916; was first admitted to First Birmingham War Hospital on October 20, 1916. There was an extensive lacerated wound over the symphysis, right body of mandible and right side of neck. There was entire loss of bone for about ¾ in. in the region of $\overline{5\ 3}|$, the mandible was practically edentulous, only the incisors remaining. In the first place an attempt was made to approximate the fragments by wiring—necrosis supervened and the result was a failure. Later an attempt was made to bridge the space, now about 1¼ in. in width, by removing a piece of bone from the right angle and planting it in the gap. This also failed, the graft coming away into the mouth. The patient was transferred to the First Southern General Hospital on December 3, 1917. The remaining teeth in the mandible were extracted and the parts allowed to clear up well. On April 22, 1918, a bone-graft measuring 3 in. in length and taken from the ilium was inserted. The graft healed in well and splints were fixed on May 7, 1918. Metal cap splints with vulcanite extension in the upper, were fixed by means of articulating tubes and bolts to a soft rubber-lined vulcanite splint in the lower, and the mandible being edentulous, a metal chin splint, struck to a model of the chin and covered with chamois leather, was worn. Good progress was made and the splints were removed on September 30, 1918, when good bony union was found to be established. Dentures were fitted and the patient discharged (*see* figs. 13, 14).

Case VI.—Private W., aged 30, wounded by shrapnel on July 31, 1917; admitted on October 1, 1917. This patient had been treated at another hospital for two months, and when admitted the wound over the left body of mandible had practically healed and splints were in position. The old splints were removed and there was found to be a gap of about 1½ in. in region $\overline{|7}$ to angle. Some teeth were extracted and the parts allowed to clear up, position being maintained with new splints. A bone-graft was inserted on April 8, 1918, the graft measuring 2½ in. in length, being taken from the tibia. This healed in well and splints—metal caps with vulcanite extensions—were fixed on April 20, 1918. The splints were removed on September 23, 1918: firm union had taken place at the anterior end, but there was some slight movement at the posterior. Splints were reinserted for a time and they were again removed on November 4, 1918, when firm bony union was established at both ends. Dentures were inserted and the patient discharged (*see* figs. 15, 16).

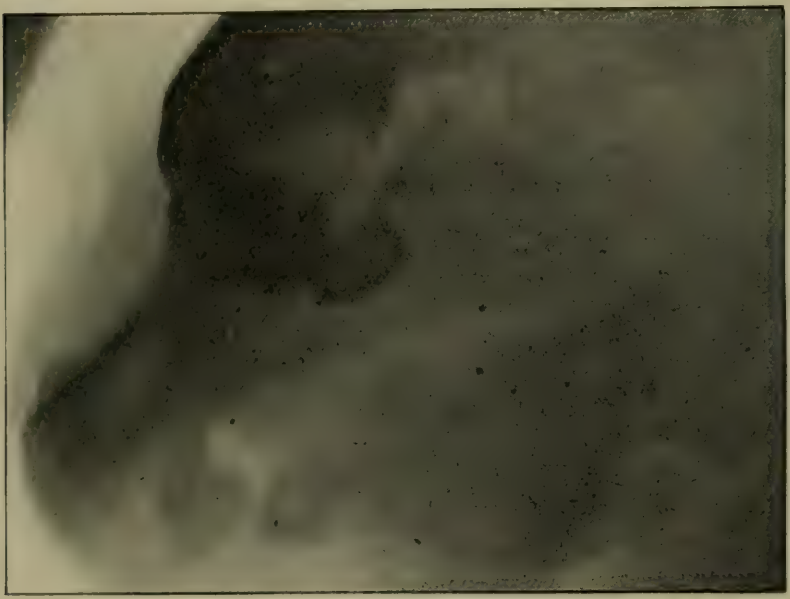

FIG. 4 (Case I, p. 64).

We desire to record our appreciation of the very valuable assistance at the operations that we have received from Captain Learmonth and Sister Dorothy Jones, of the First Southern General Hospital; also to Captain Strannack, Dental O.C. Jaw Centre, and to Captain Patterson and Lieutenant Scott, Dental Surgeons, for their valuable help in the Dental Department.

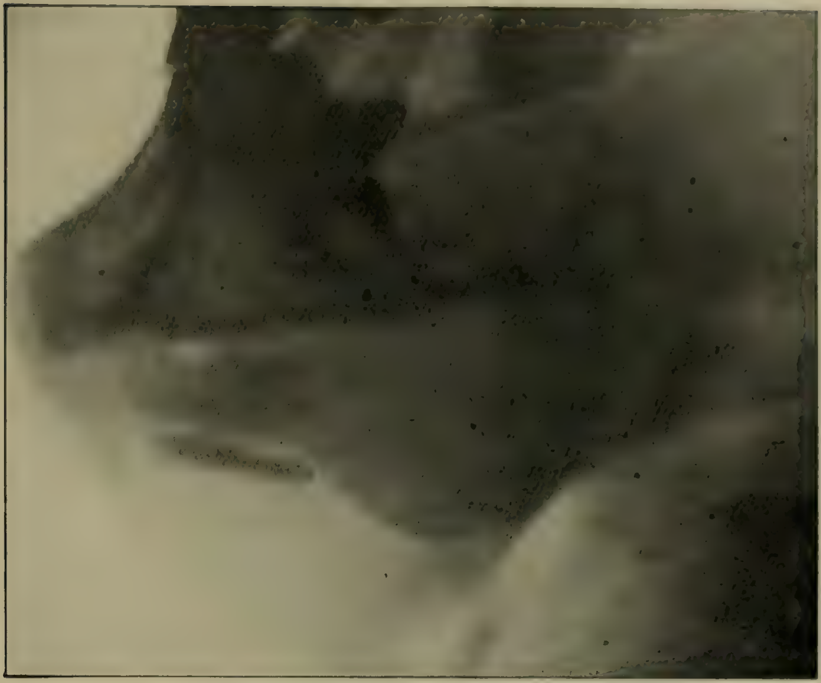

FIG. 5 (Case I, p. 64).

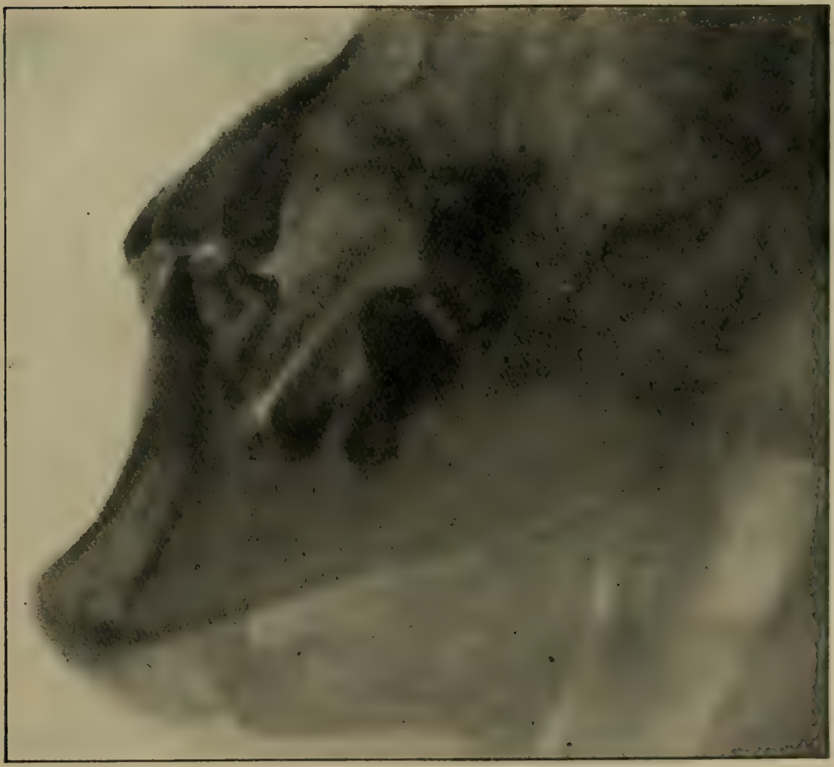

FIG. 6 (Case I, p. 64).

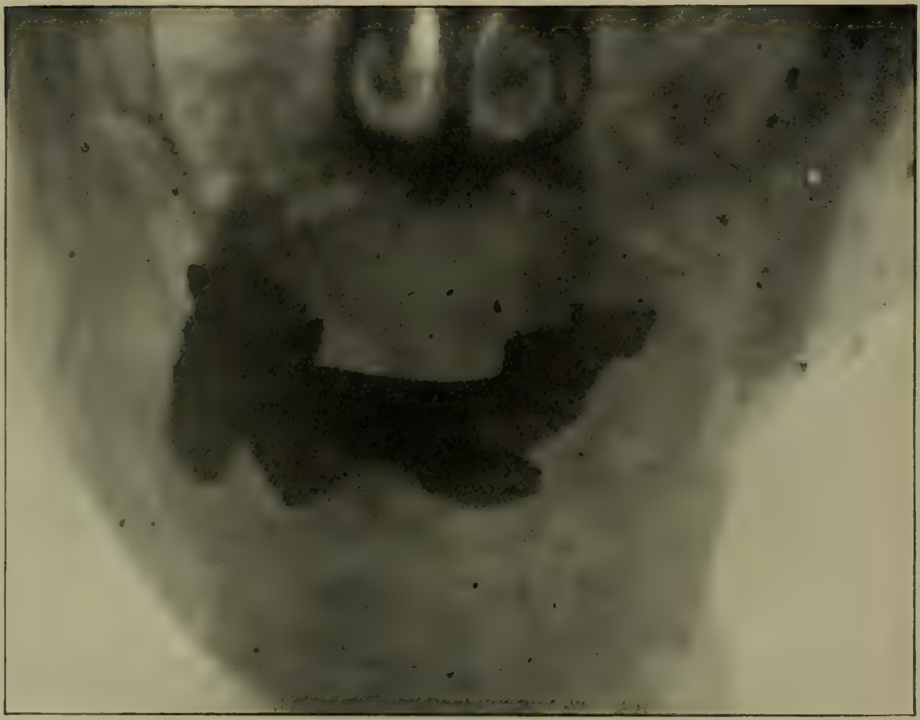

FIG. 7 (Case II, p. 64).

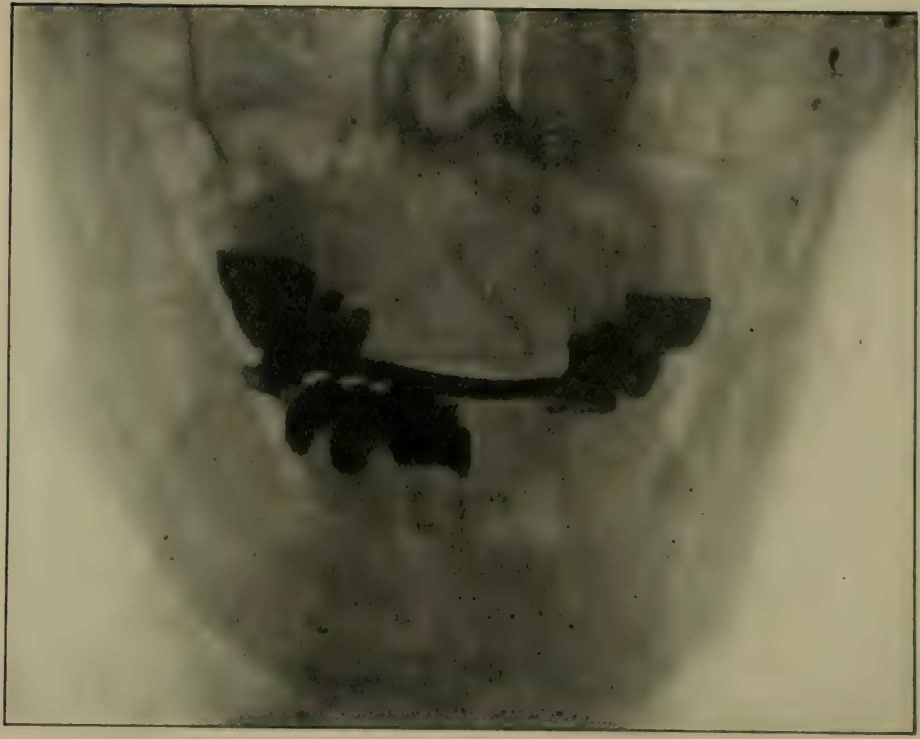

FIG. 8 (Case II, p. 64).

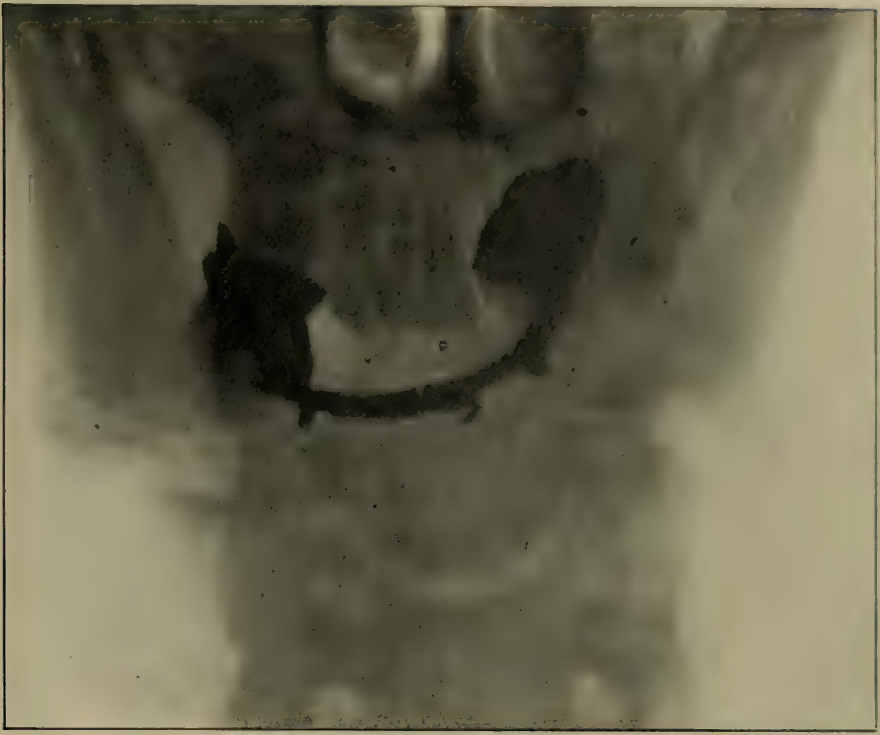

Fig. 9 (Case III, p. 64).

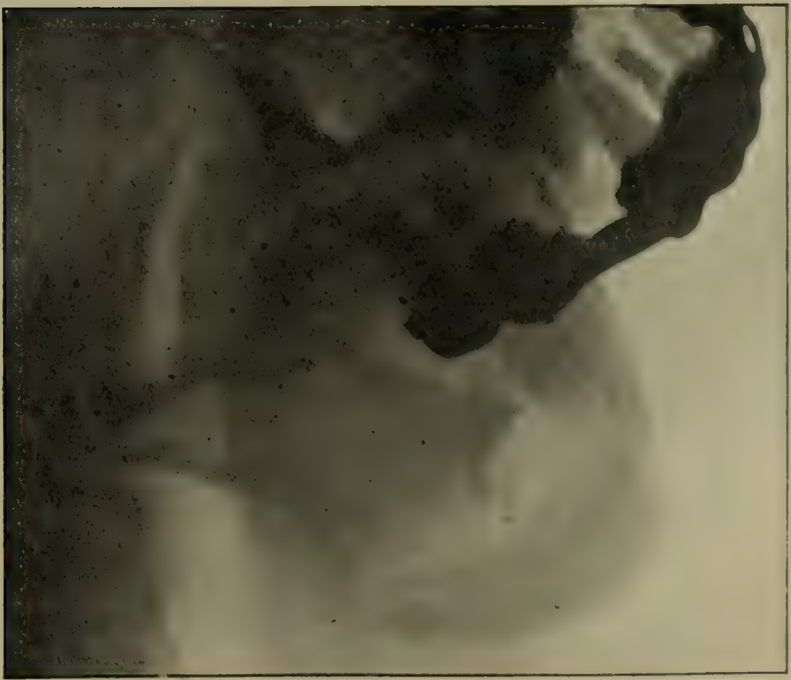

Fig. 10 (Case III, p. 64).

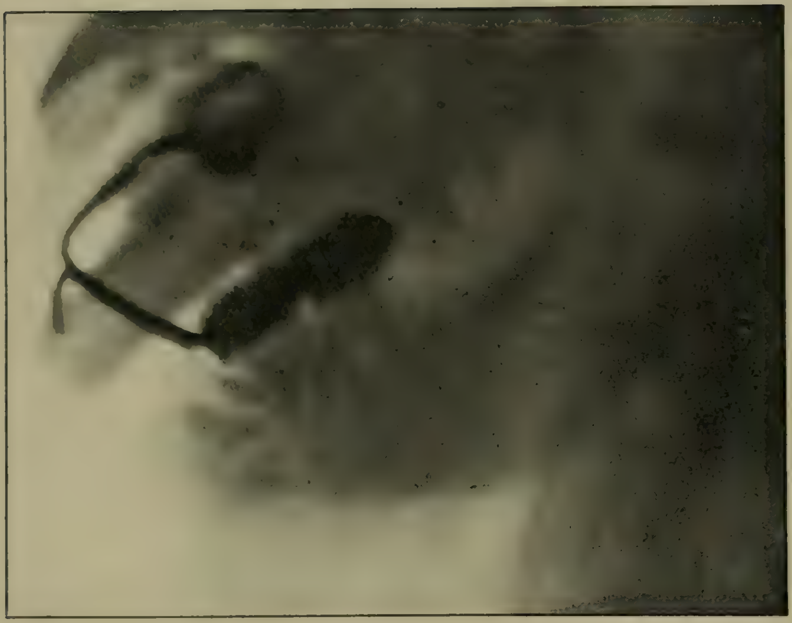

Fig. 11 (Case IV, p. 65).

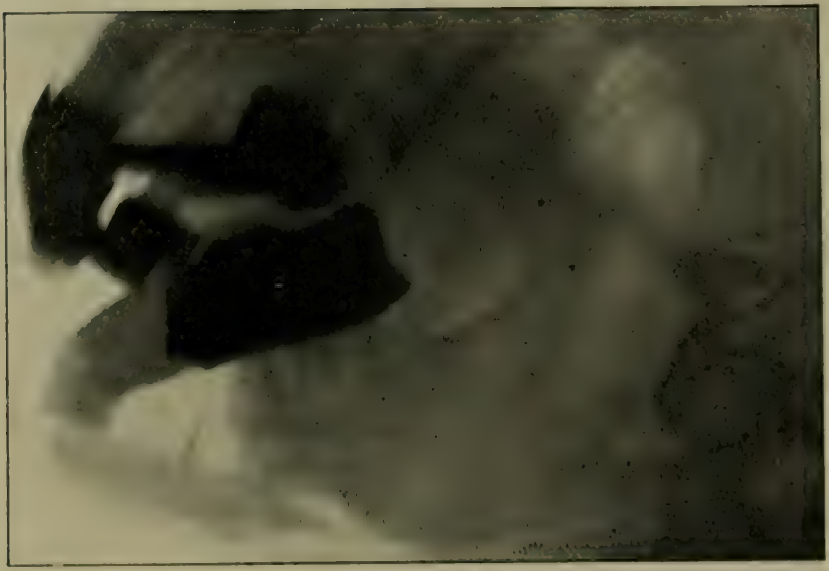

Fig. 12 (Case IV, p. 65).

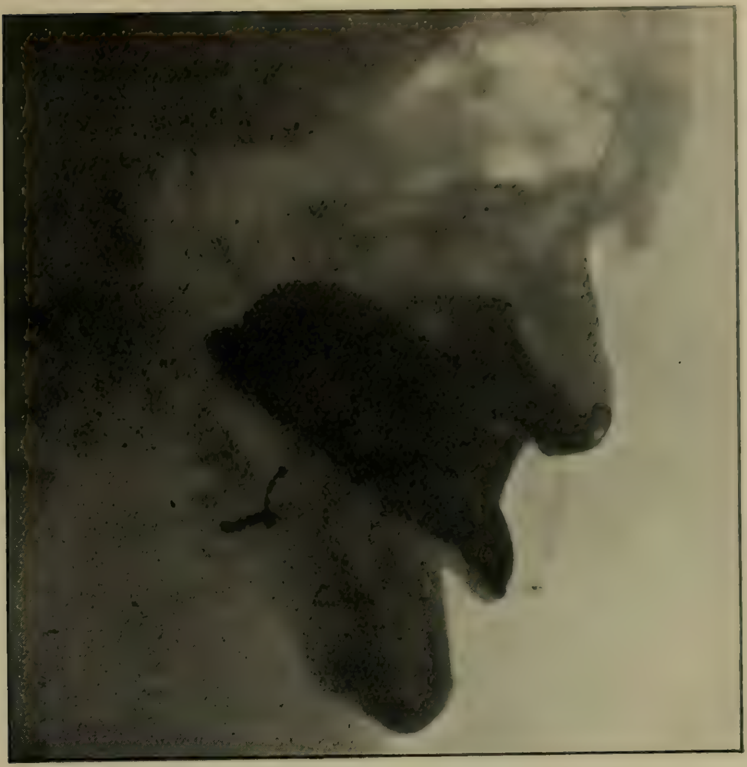

FIG. 13 (Case V, p. 65).

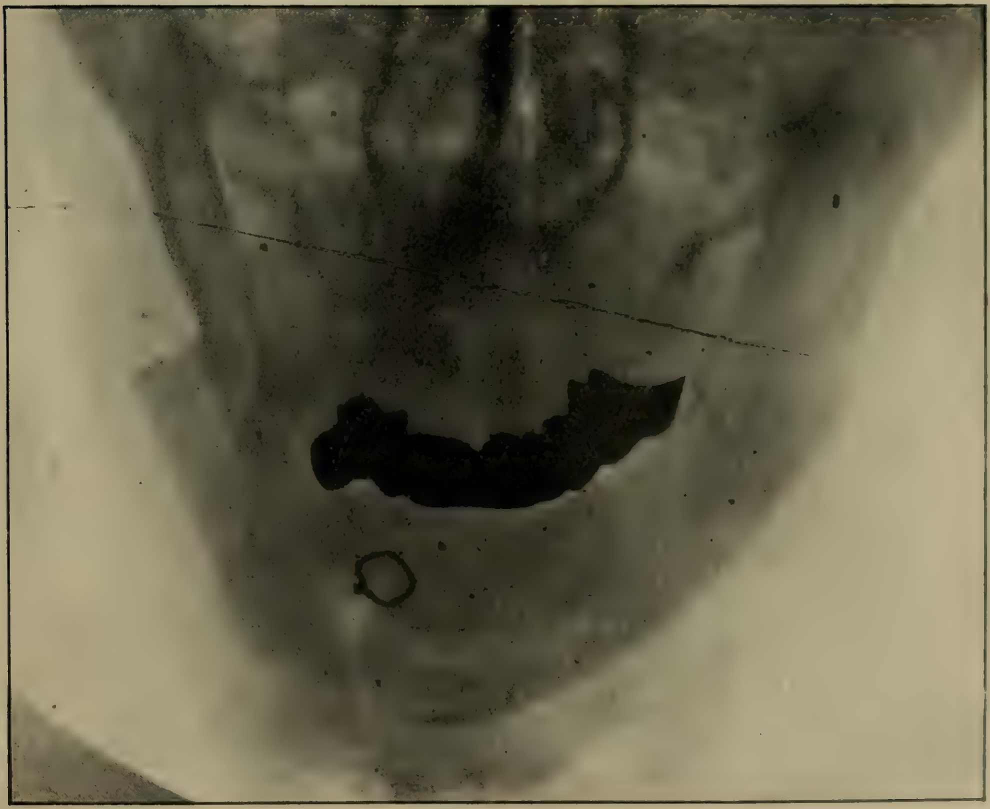

FIG. 14 (Case V, p. 65).

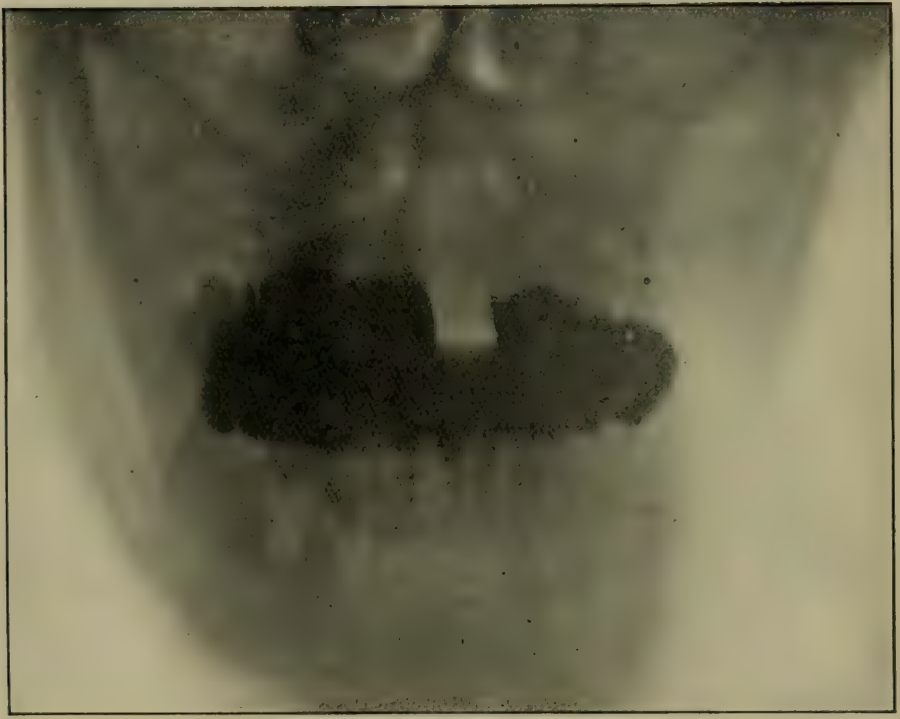

FIG. 15 (Case VI, p. 65).

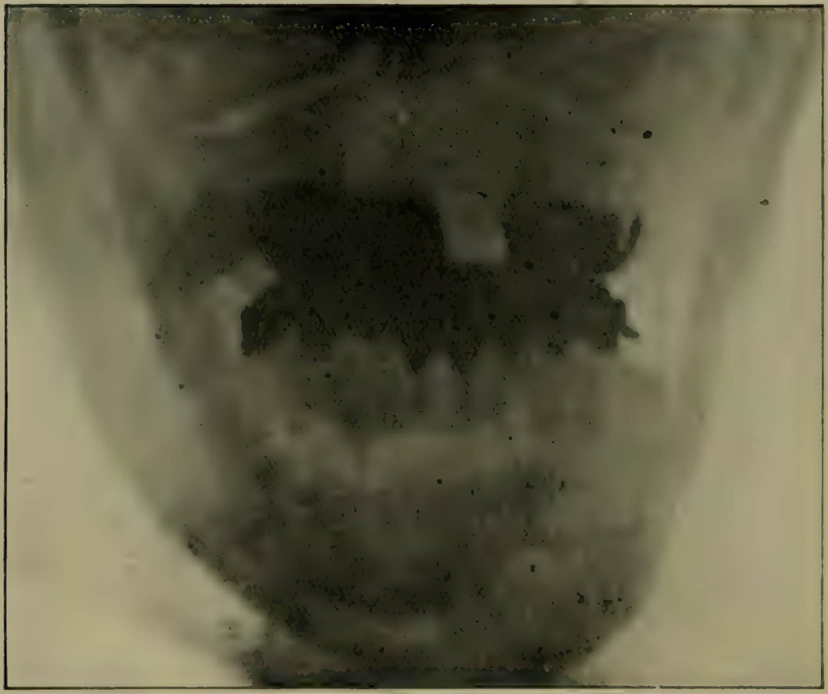

FIG. 16 (Case VI, p. 65).

Section of Odontology.

President—Mr. G. G. Campion, L.D.S.Eng.

Prosthetic Treatment of Old Injuries of the Maxillæ.[1]

By W. Kelsey Fry, M.C., M.R.C.S., L.D.S.

(Late Officer-in-Charge, Dental Department, Queen's Hospital, Sidcup).

For the past two and half years I have had the opportunity of dealing with a large number of cases of old injuries of the maxillæ, and although at first our lines of treatment were very indefinite, we have now reached a stage when it is possible to divide the cases into more or less definite classes. This work is very closely associated with plastic surgery, and many cases which previously required prosthetic treatment are now adequately dealt with by the plastic surgeon. It is very seldom that I have had to construct a prosthetic appliance for the restoration of the soft parts, and these cases are chiefly of men who for various reasons are unable to undergo operations, and to such isolated cases as the loss of eyelids, &c. In no instance have I had occasion to restore a large loss of the soft palate, and I fear that the majority of these cases end fatally in the early stages.

In this communication I only propose to discuss intra-oral prosthetic appliances.

Before describing these appliances in detail, I propose to dwell for a short time on the difficulties met with in taking impressions for the construction of the appliances and the means to overcome them. All impressions as far as possible are taken with plaster of Paris, in many cases with the aid of cotton wool and black gutta-percha. The plaster of Paris for these cases is of special importance owing to the fact that almost invariably they present false attachment of the soft parts to the maxillæ. The chief difficulties met with are:—

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[1] At a meeting of the Section, held March 24, 1919.

(a) The Frequent Constriction of the Opening to the Mouth.—In such cases it is often impossible to insert an impression tray of sufficient size, and it is necessary to make two special half trays, as shown in fig. 1. It is then possible either to take a whole impression at once or to take the two half impressions separately and construct the necessary base plate for them, and later to take an impression with the two base plates in position.

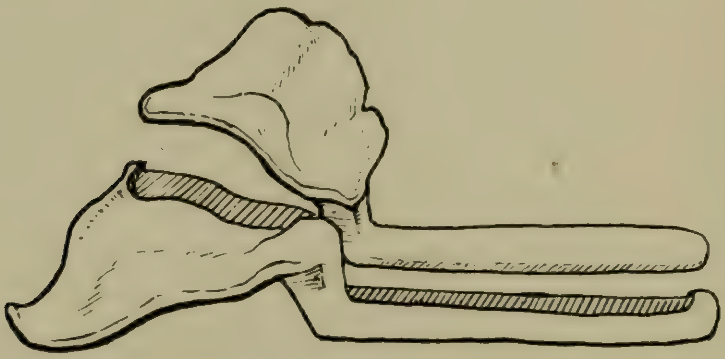


FIG. 1.

Special impression tray made in two parts.

(b) A Narrow Sulcus.—Many cases present themselves with tight scarring of the soft parts of the face which maintains them in the closest apposition to the maxillæ; it thus becomes difficult to obtain the necessary impression of the sulcus. This is overcome by inserting in the sulcus cotton wool soaked in plaster of Paris immediately before the main impression is taken.

(c) Openings in the Palate into the Nasal Cavities.—When it is required to take an impression only of the palatal opening, cotton wool soaked in plaster of Paris is again used; but when it is desired, as often happens, to take a deep impression of the cavity, the use of black gutta-percha, as first suggested to me by Sir Francis Farmer, proves of great value.

These difficulties are well illustrated in the case of Captain T. This patient came under my care for the construction of a denture. There was marked constriction of the opening of the mouth, together with very narrow sulci, and also a perforation of the palate, but a palatal arch of normal width. The fact that the patient had a very sensitive soft palate, and was unable to control the flow of saliva, was another difficulty. It was necessary to obtain impressions of the oral surface of the palate, a deep impression of the opening, together with a portion of the nasal surface of the palate. The method employed was as follows: A small piece of black gutta-percha was inserted in the opening of the palate, and by continuous pressure was made to take an impression of part of the nasal surface of the palate and of the opening. The gutta-percha was removed before it had become hard and was shaped by the aid of a hot knife in such a manner that it was easily removed and inserted. It was then partly softened again and re-inserted to obtain an accurate impression, being left *in situ* for about two hours. The gutta-percha was then vaselined, and cotton wool soaked in plaster of Paris inserted in the dental sulci in the right and left molar regions, and a third piece placed in the deep part of the perforation where it had been necessary to remove a portion of the gutta-percha. The left half-impression tray was then filled with plaster and inserted, quickly followed by the corresponding right half, which had been previously vaselined to prevent the adhesion of the plaster. The plaster having set, the right half-tray was easily removed, the impression of the right maxilla was then taken out, together with the cotton wool from the sulcus and the perforation, by fracturing it along the line of the left impression tray. This latter, together with the impression, was then easily removed, and finally the black gutta-percha was taken out, the whole was fitted together, making one impression, and cast, as shown in fig. 2.

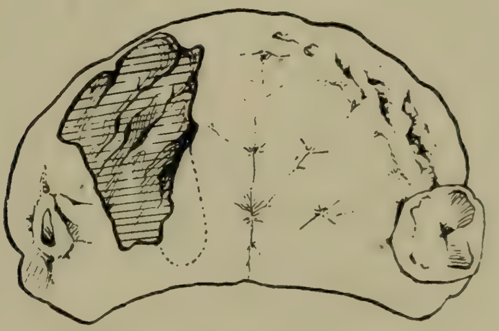


FIG. 2.

Impression of maxillæ showing perforation.

In the construction of intra-oral appliances, the great aim had been to restore as far as possible the contour of the face and the function of mastication. The appliances are made as simple as possible, are easily removable, easily kept clean, and in case of damage easily reparable.

Fixed bridge work has not been used except in rare instances. In describing in detail the construction of these appliances, it is advisable to classify them according to the nature of injury received as follows: (1) Displacement of hard tissue without loss; (2) Loss of teeth only; (3) Loss of bone.

(1) Several cases have presented themselves in which there has been a displacement backwards of the maxillæ without loss of tissue, due in most cases to flying accidents. On examination it has generally been found that no attempt had been made in the early stages of treatment to reduce the displacement, and the maxillæ have become firmly fixed in their new position with a resulting loss of articulation and the falling back of the upper part of the face (*see* figs. 3 and 4). The appliance used to correct the deformity, as first suggested by Major Rishworth, N.Z.D.C., is one by which it is possible to bring the maxillæ forcibly forward by using the forehead and mandible as *points d'appui* and obtaining the necessary forward pressure by means of screws (*see* fig. 5, p. 78). This apparatus has proved very efficient, and is usually not required to be worn for more than one week. For the first two or three days the patient experiences pain in the region of the glenoid cavities and slight headache. It is very essential in using this apparatus that when the maxillæ have been brought to their correct position, they should be immediately immobilized by fixing them to the mandible by means of a double Gunning splint. This splint is then worn for

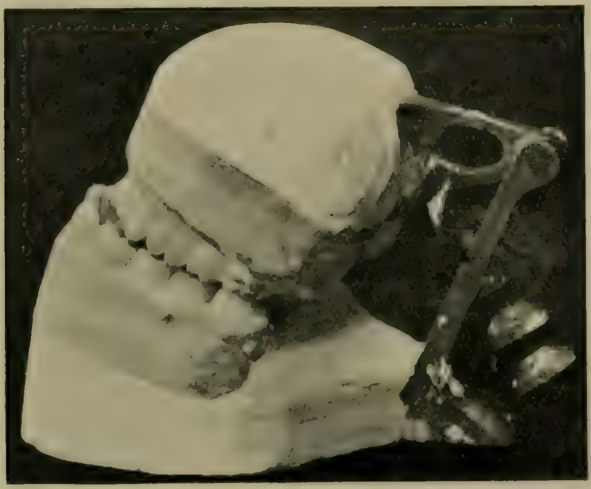


FIG. 3.

Model showing loss of articulation due to displacement of maxillæ.

a further two or three weeks, after which the patient is given upper and lower splints with guiding flanges.

(2) *Loss of Teeth only.*—These cases resolve themselves generally into the necessity of constructing a more or less simple denture. Nevertheless, there is one type of case which has caused considerable difficulty—viz., when there is a loss of all the teeth on one maxilla with all the teeth remaining on the other maxilla. The type of prosthetic appliance used is shown in fig. 6 (p. 79). As will be seen, the main support for the denture is by means of stirrup bands. I am greatly indebted to Sir Francis Farmer for having brought to my notice the use of these clasps for this particular type of case, and it is very essential that these clasps should be made of specially drawn out platinized gold wire.

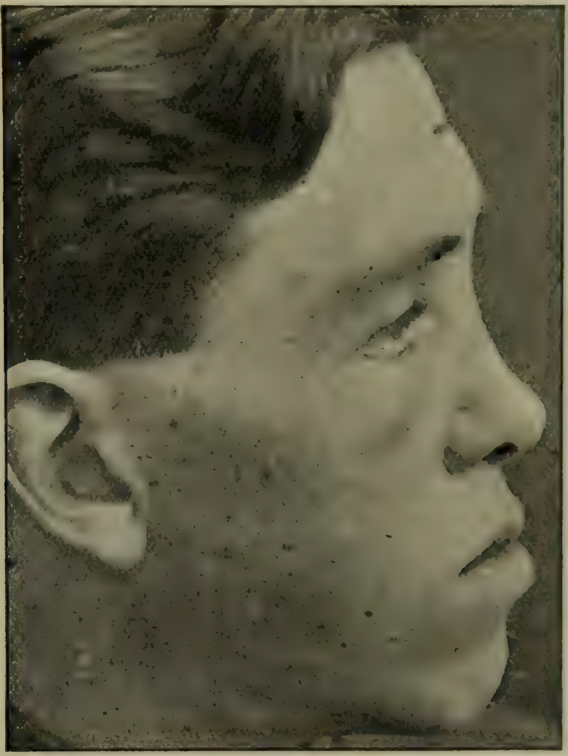


FIG. 4.

Photograph showing deformity due to displacement of maxillæ.

(3) *Loss of Bone.*—These cases are sub-divided into the following: (*a*) Loss of alveolar border of maxilla; (*b*) loss of palatal portion; (*c*) loss of premaxilla; (*d*) loss of premaxilla with part of alveolar and palatal portions of maxilla; (*e*) total loss of premaxilla, alveolus and palate.

(*a*) I do not propose to dwell on this class except to point out that most instances are complicated by extensive false attachments of the soft part of the maxillæ, which prevent the construction of a functional denture. It is then usually necessary to perform an epithelial inlay operation for the restoration of the dental sulcus before the denture is constructed. To aid the surgeon in this operation the splint shown in fig. 7 (p. 80) is used for the purpose of maintaining the "stent" in position while the epithelium becomes attached in the required position.

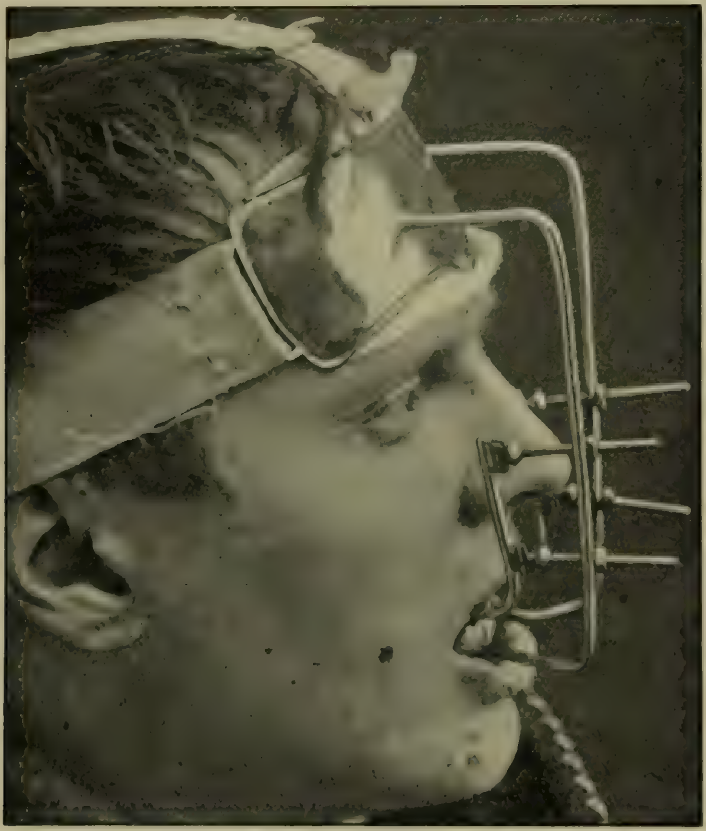


Fig. 5.

Major Rishworth's apparatus to correct displacement of maxillæ.

It must be remembered that once the sulcus has been restored and the "stent" removed, the final denture must be inserted immediately, otherwise there is a danger that the sulcus may retract.

(*b*) *Loss of Palatal Portion.*—These cases have proved of exceptional interest from the fact that, in many instances, one would have been unable to construct a functional denture had it not been for the hold obtained for the denture by making use of the perforation. In the early cases under treatment soft rubber was attached to the denture and made to hold into the perforation, and thus to support the denture by lateral pressure, but it was generally found that such pressure resulted in ulceration and absorption, and the denture rendered non-functional in a very short time. The method now adopted is to utilize definitely the nasal surface of the palate for the means of support of the denture, the denture being made to consist of two portions, nasal and oral, which are locked together by a simple mechanical device. Thus the means of support for the denture is by lodgment upon the nasal surface of the palate instead of by continuous lateral pressure upon the sides of the perforation. For the purposes of describing the appliances used it is advisable to classify cases of loss of the palate as follows: (i) When the perforation is not required for the support of the denture; (ii) When it is only partially required, the main support being obtained by other means; (iii) When it is required for the main support of the denture.

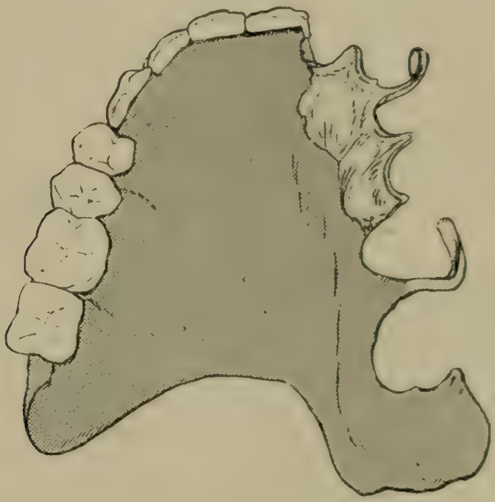


Fig. 6.

Denture constructed in case of loss of all teeth on one side.

(i) When the perforation is not required for the support of the denture, the denture is merely made to fit over the opening, and thus prevent food, &c., passing through the perforation.

(ii) Many cases are met in which there is a loss of all the teeth on one side together with a perforation. It is obvious that if a simple denture is constructed for this case, it is very liable to be unstable from the weight being one-sided. To overcome this a partial support is obtained from the perforation. A denture is made in the usual manner except that where it passes over the perforation a small loop is attached on the nasal surface of the denture. Black gutta-percha is made to fit and extend into the perforation and to be attached to the plate by means of the metal loop. A large number of cases have been treated by this method with good results, the black gutta-percha being far more serviceable than soft rubber, and having the great advantage of being able to be renewed whenever necessary. Quite recently a patient was returned to hospital for further plastic operations who had been wearing one of these plates for one and a half years, and on examination, the black gutta-percha was found to be in a very satisfactory state.

(iii) Cases where the perforation is required for the main support of the denture are well exemplified by the case of Captain T., referred to above. A piece of black vulcanite was made the shape and size of the previously-described piece of black gutta-percha, which the patient was able to insert and take out of the perforation, the addition of a small metal knob on the palatal surface of the vulcanite rendering this more easy. There was also fixed in the vulcanite over the perforation a metal tube carrying within it in the upper part a smaller threaded tube, as shown in fig. 8. The denture was then made to fit over the plug with a vulcanite prolongation upwards into that part of the perforation which was not occupied by the plug. The means of attachment of the denture to the plug was by a simple mechanical device which enabled a screw to be attached to the denture and to pass into the tube in the plug, and to be screwed up by means of a matrix spanner bringing the denture and the plug into close apposition (*see* fig. 9). Thus the chief means of support to the denture is the plug resting on the nasal

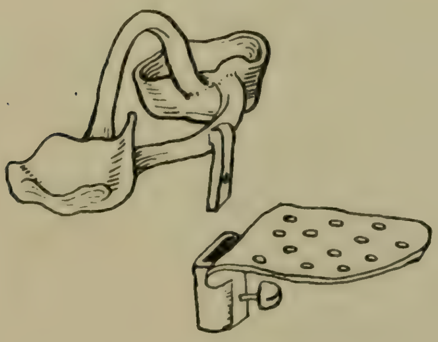


FIG. 7.

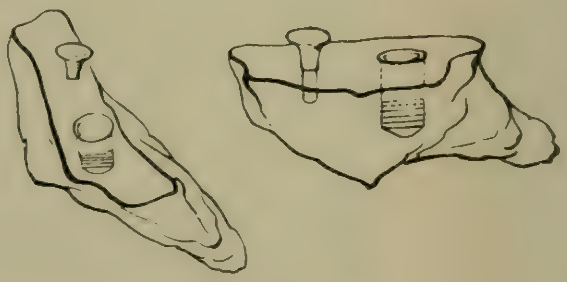


FIG. 8.

Fig. 7.—Splint used in epithelial inlay operation.
Fig. 8.—Vulcanite plug fitting on nasal surface.

surface of the palate through the perforation, and it is impossible to remove the denture except by releasing the screw. As will be seen by figs. 9 and 10 this screw is so constructed that it is undetachable from the denture and cannot be lost or swallowed. The complete denture is shown in fig. 11. This prosthetic appliance also illustrates another very important mechanical device. As will be seen from the diagram the patient had only the upper left molar remaining. Had a clasp been fitted in the usual manner—i.e., fitting round the mesial, palatal and distal surfaces of the tooth, it would have had the tendency

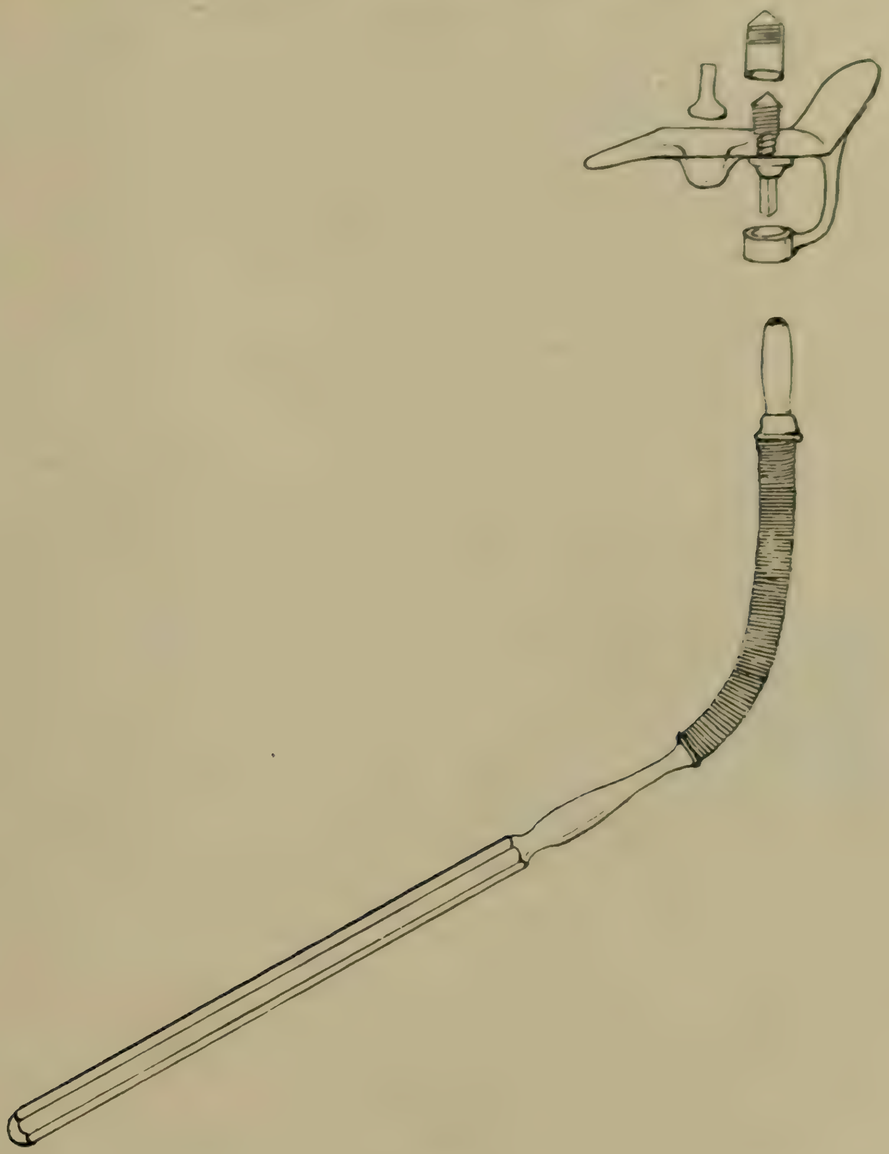


FIG. 9.

Metal parts of plate, showing screw attachment and Lennox spanner.

to lift the plate away from the right side, but by the construction of two separate bands for the one tooth, one fitting round the mesial and part of the palatal and buccal surfaces, and the other round the distal and part of the palatal and buccal surfaces, this detrimental effect was

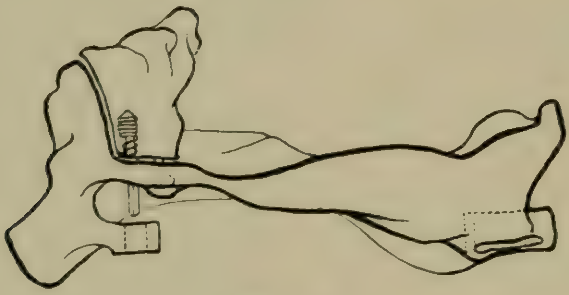


Fig. 10.

Nasal portion attached to oral portion before teeth were added.

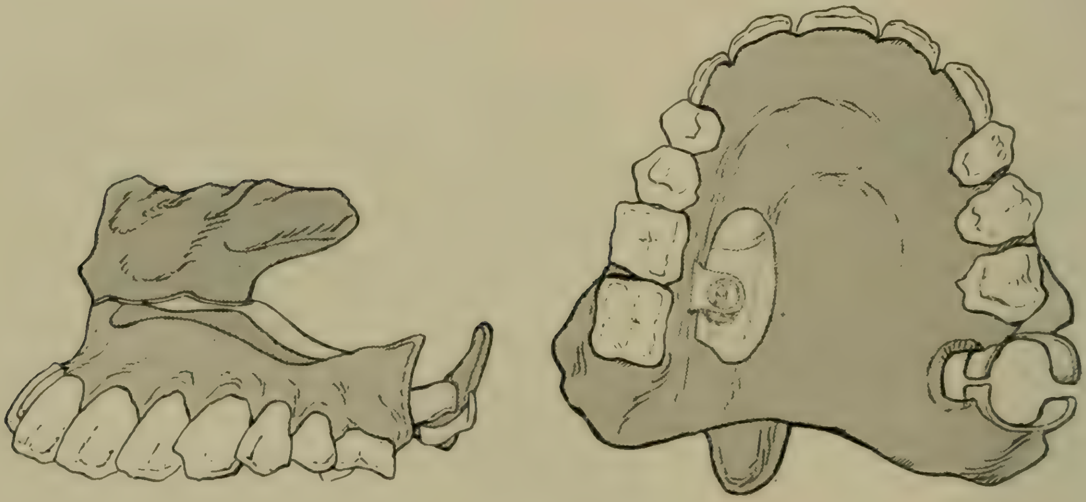


Fig. 11.

Complete denture.

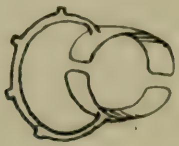


Fig. 12.

Special clasp.

avoided, and the full benefit of the clasp obtained (*see* fig. 12). This type of clasp will be found of very great value in ordinary dentures with only one or two teeth standing.

(*c*) *Loss of Pre-maxilla.*—Patients with loss of the pre-maxilla present themselves in one of two conditions: (i) When the patient has been under special treatment from the early stages, it is often found that the soft parts have been held out by a prosthetic appliance in their normal position, thereby keeping patent the opening between the oral and nasal cavities. (ii) The more general way—viz., when the nasal cavity has become closed off from the oral cavity with a resultant falling in of the upper lip and of the lower portion of the nose, with the consequent difficulty of fitting a functional denture owing to the abnormal adhesions of the soft parts to the maxillæ. It has often been noticed that in these cases operations have been performed in the early stages of treatment for the definite closing up of the opening, this resulting in a marked deformity. When the opening has been closed the method of treatment now adopted is to separate the soft parts from the maxillæ by means of an epithelial inlay operation, and to restore the opening, the object being to correct the contour of the face, and to enable a functional denture to be fitted. The case of Private P. illustrates this method of treatment. As will be seen from fig. 13, he

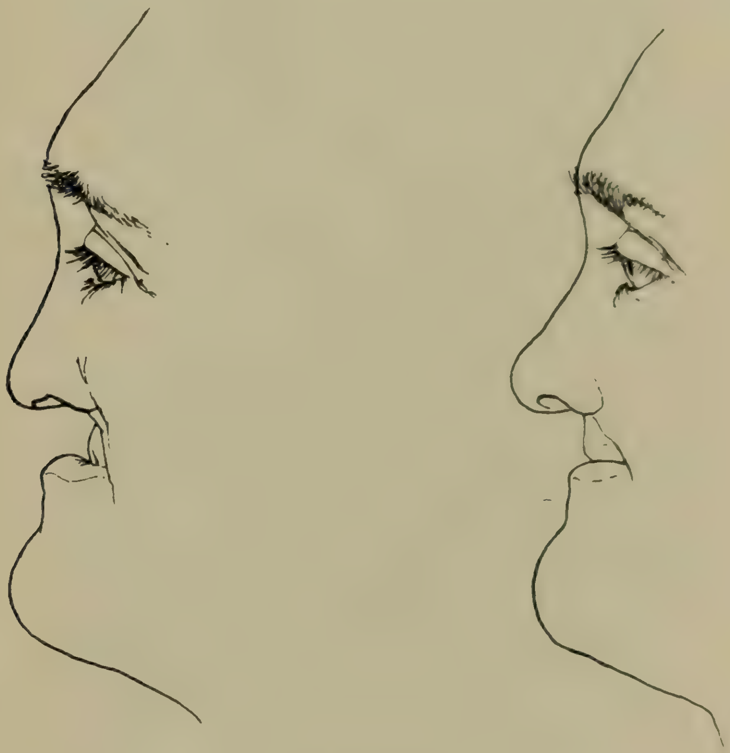


FIG. 13.

Before treatment. After treatment.

presented a distinct falling in of the upper lip and of the lower portion of the nose, and on intra-oral examination it was found that he had only one molar left on each maxilla, and there was marked forced attachment of the soft parts. Had a simple denture been made to be held in position by clasps round these teeth it would have been of very little functional value, and the strain put upon the teeth would have been such that they would not have rendered him service for very long, and their loss would have been disastrous from the point of view of afterwards fitting him with a satisfactory denture. An operation was performed to separate the soft parts from the maxillæ, and the prosthetic appliance shown in fig. 14 inserted. The appliance consists of a simple denture with a prolongation upwards made to replace the premaxilla lost. The premaxillary portion is best made of black gutta-percha and attached to the denture as previously described, the reason being that it possesses just the necessary spring to enable the apparatus to be easily removed and inserted. This black gutta-percha may require renewing at the end of a year, and when it is impossible to keep the patient under observation it is necessary, after the patient has become used to wearing the gutta-percha, to have it replaced by hard rubber with a small portion of soft rubber on the anterior surface of the upper extremity, where it rests against the soft tissues. As will be seen from fig. 14, the main support of the denture is by means of the

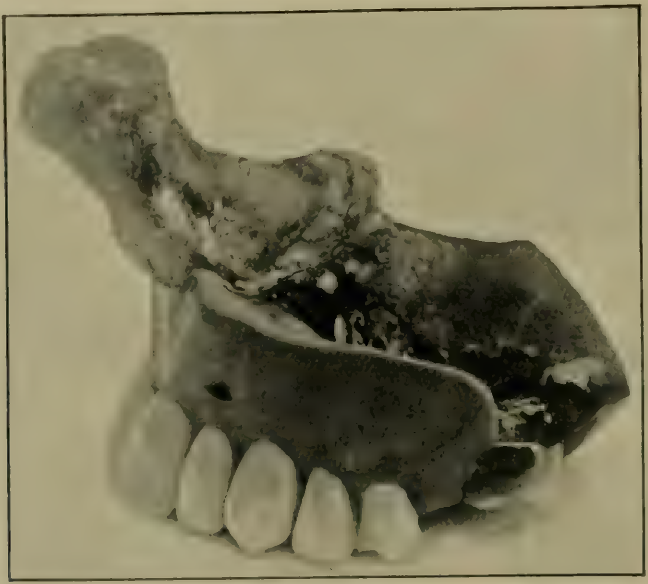
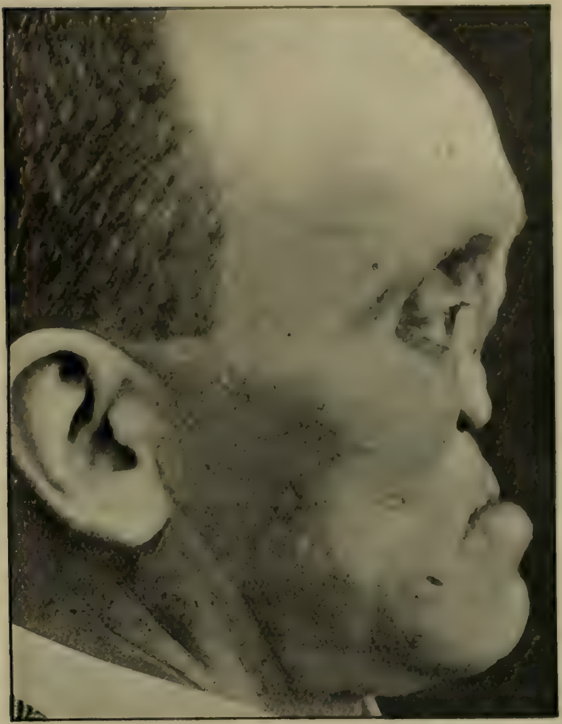
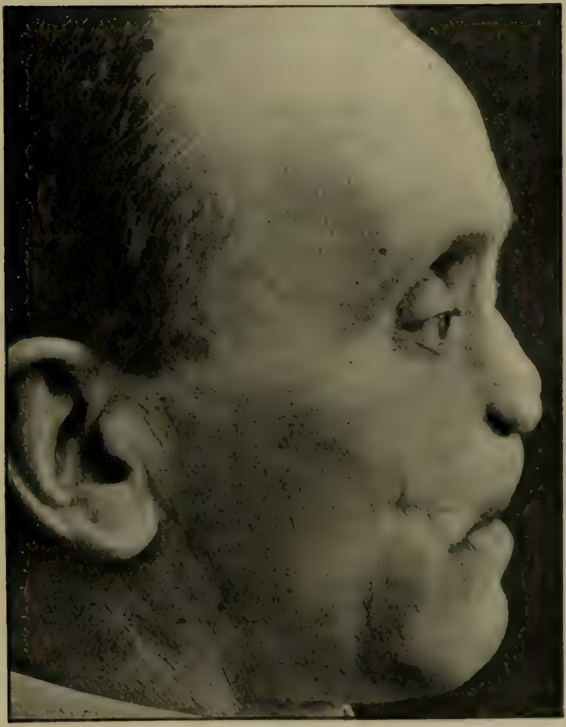


FIG. 14.

Prosthetic appliance worn by Private P.



(*a*) Before treatment.



(*b*) After treatment.

Fig. 15.

prolongation into the nasal cavities, and the strain is thus taken off from the two remaining molars. In the case under notice the result was very satisfactory, the contour being restored and a very functional denture obtained.

(*d*) *Loss of Premaxilla with part of Alveolus and Palatal Portion of Maxillæ.*—Cases of this type naturally present the same deformities and loss of masticating power as the above type, but to a greater degree, and the patients are very sensitive about such deformities and seek means for their rectification. This being the case it becomes necessary to bring forward the soft tissues to their normal contour, and this naturally results in a large communication between the oral and nasal cavities. This loss of bone is replaced either by means of plastic surgery or by a prosthetic appliance. The latter method has been adopted because

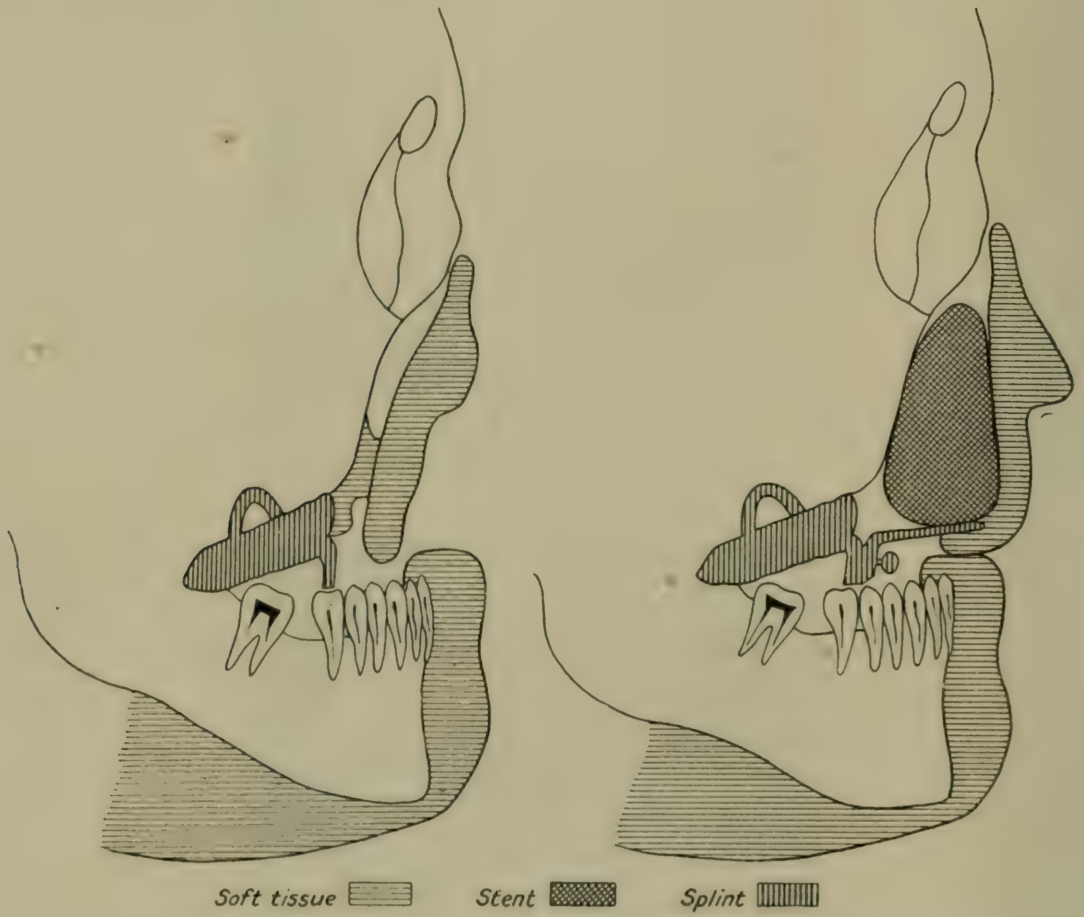


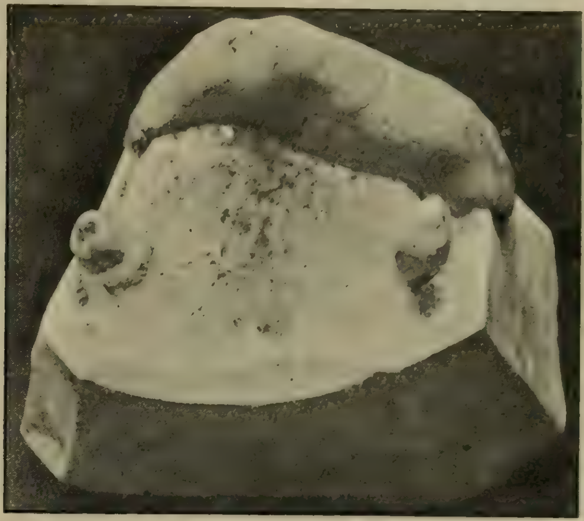
Fig. 16.

Sketches from X-rays showing condition before and after epithelial inlay.

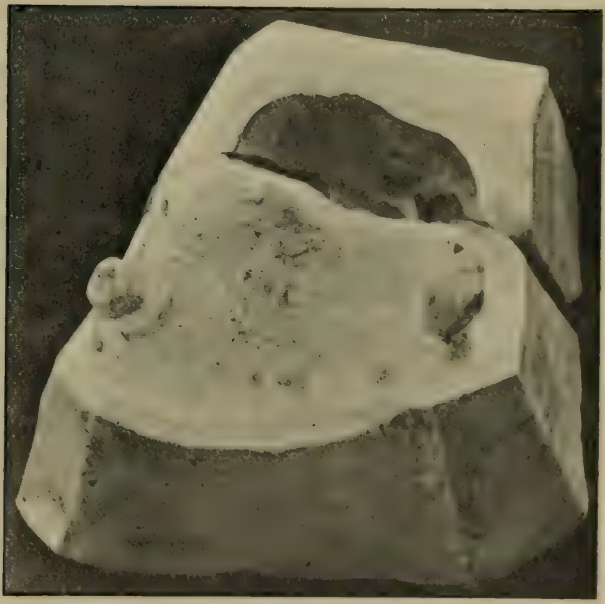
Before operation: showing soft tissue adherent to hard parts.

After operation: showing "stent" held in position by means of splint.

of the difficulty resulting from fitting a functional denture over such a large surgical replacement. Nevertheless, Major H. D. Gillies, R.A.M.C., has several cases now under treatment in which surgical replacement is being adopted. In considering the construction of the appliance for these patients, one point differing from the above classes is of great importance—namely, that owing to the small amount of the normal palate remaining in these cases, the main upward pressure of the denture



(*a*) Model before treatment.



(*b*) Model after treatment.

Fig. 17.

during mastication is taken by that portion of the appliance which is made to replace the bony loss. In the early cases under treatment this was not fully realized, with the result that every time the patient put pressure on the denture during mastication there was an unpleasant lifting of the soft tissues (upper lip and nose). But this has now been overcome by always finding some remaining intranasal bony tissue to take the pressure, and if necessary to extend the prosthetic appliance backwards or laterally to obtain such support. The following case well illustrates such an appliance: Mr. W. This patient was admitted with the very marked facial disfigurement shown in fig. 15 (p. 85), and with only a small part of the palate and two teeth remaining. The treatment adopted was to separate the soft tissues from the hard by means of an epithelial inlay operation (*see* figs. 16, 17, pp. 86, 87) and to construct the necessary appliance which both held the soft tissues forward and acted as a functional denture. To facilitate easy fitting and removal, the appliance, as shown in fig. 18, was made in three parts: (i) a simple denture fitting over the remaining part of the palate and the prosthetic replacement of the lost palate; (ii) a hollow box held in front of the remaining part of the maxillæ constructed to represent the bone lost; and (iii) a prolongation backwards with the object of obtaining the necessary bony support to the upward pressure exerted by the denture. As will be seen from figs. 19 and 20, the apparatus is simple and easily kept clean. Part (iii) is first inserted, followed by part (ii), which will be seen to fit over part (iii), and is held in close contact with it by the

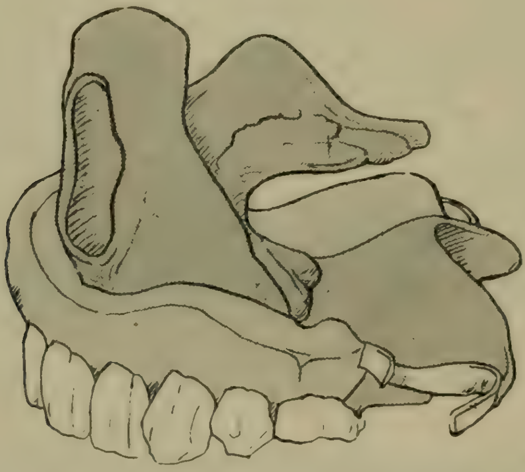


FIG. 18.

Complete denture.

pressure of the soft tissues covering it. The denture is then placed in position. In most cases it is necessary to affix the denture to part (ii) by means of a screw, but in the case under notice the screw was discarded after a week's use, as it was found that the denture remained *in situ* quite satisfactorily without it owing the structure of the parts.

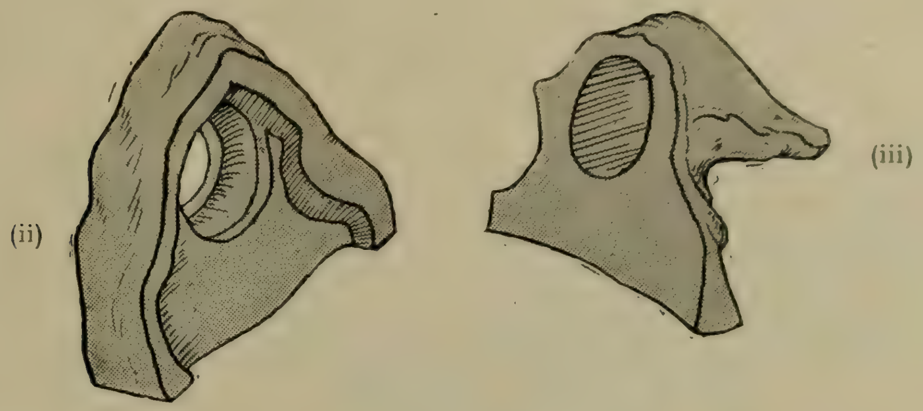


FIG. 19.

Upper part of denture to restore nasal loss.

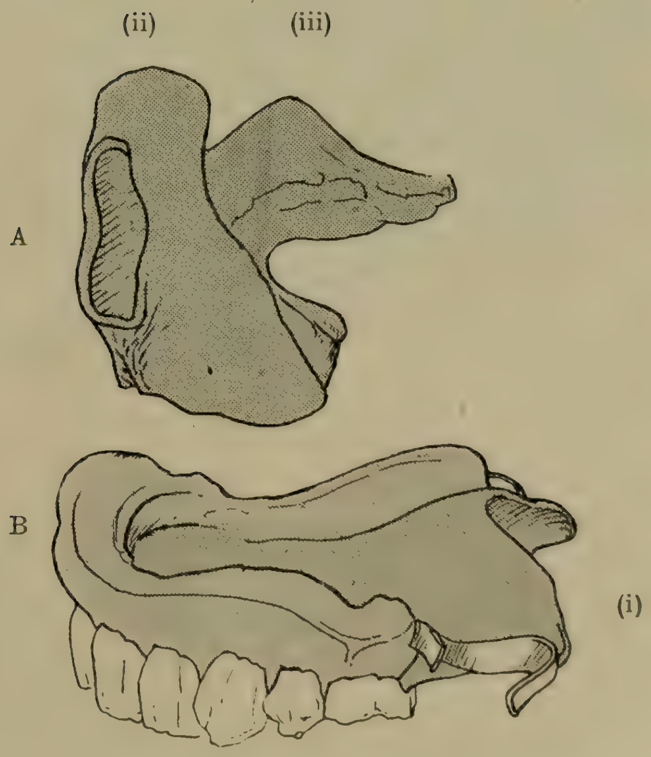


FIG. 20.

Denture shown in two parts, A, B.

(*e*) *Total loss of Premaxilla, Alveolus and Palate.*—Extensive loss of this nature is very rare, and only one case has come under my notice, and with this patient the nasal spine of the premaxilla was remaining, which preserved the contour of the face. Nevertheless, there was a complete loss of all the intra-oral portions of the maxillæ (*see* fig. 21). The case referred to is that of Lieutenant W., and his injuries were the result of an aeroplane accident. The early treatment of this case has been described in the *Proceedings of the Royal Society of Medicine*, 1918, xi (Section of Laryngology), pp. 90-94. The support for the denture was obtained by enlarging the openings already present into the antra, this operation being performed by Major G. Seccombe Hett, R.A.M.C. (*see* fig. 22). The prosthetic appliance finally fitted differs completely from the apparatus described in the previous article, as it was found that the latter was quite impracticable. The apparatus now being worn was made as follows: The necessary impression of the antra and surrounding tissues was obtained by the plaster and black gutta-percha method, and two hollow boxes were made which together re-

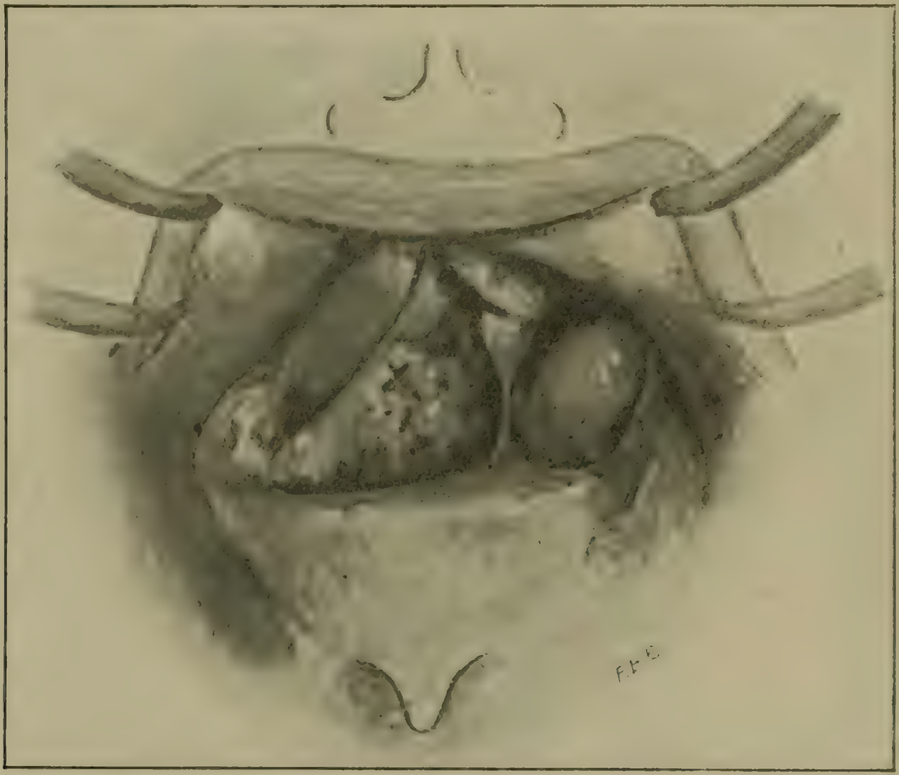


Fig. 21.

Condition on admission.

placed the bone lost. Fig. 23 shows that the boxes were so constructed that when the left half was placed in position the right half could be inserted, and the two locked together by a simple mechanical device. The prosthesis as a whole was held in position by the two lateral prolongations into the right and left antra respectively (*see* fig. 24), it being impossible to remove the appliance without unlocking the two halves. The lost bone having been replaced by this fixed prosthesis, it became a simple procedure to fit a denture, this being done by means of two split pins attached to the denture, which fitted into tubes inserted in the hollow boxes (*see* fig. 25). The patient was returned to duty, and the appliance has been worn by him for nine months and has given total satisfaction. Fig. 26 shows the complete appliance.

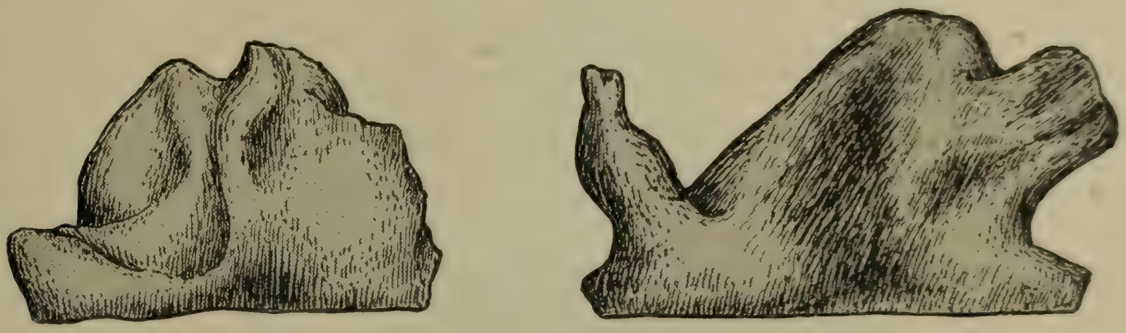


Fig. 22.

(*a*) Impression before operation. (*b*) Impression after operation.

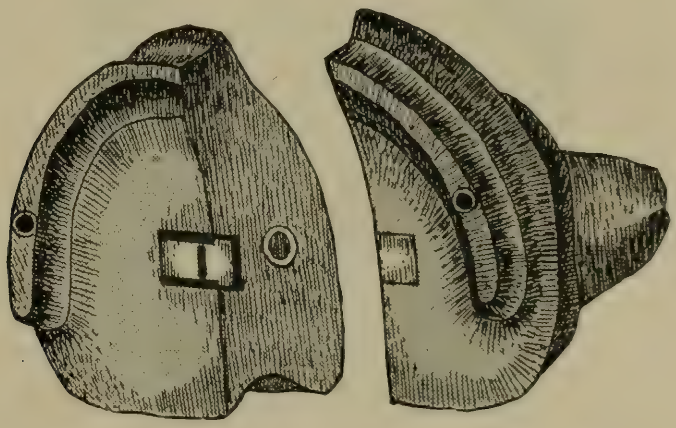


Fig. 23.

Prosthetic palate showing details of construction.

This apparatus again illustrates in a remarkable manner the principle referred to above, of seeking out bony tissue not only for the support of the denture but for taking the upward pressure during mastication, and thus obviating the unavoidably conspicuous apparatus, as suggested by Major Kazanjian, entailed by using the forehead and supra-orbital ridges to resist this pressure.

The construction of the hollow boxes presented difficulty for some time. Many of the old methods, such as the use of water, ether, &c., were tried, but owing to the complicated shape of the boxes and the accuracy of fit that was required, these methods did not prove successful. Eventually the following method was adopted: The wax mould with the metal fittings having been prepared, temporary wires were attached to the metal parts to hold them in position in the plaster. A piece of aluminium about $\frac{1}{8}$ in. thick and nearly $\frac{1}{2}$ in. in diameter was then threaded with a $\frac{7}{32}$ in. thread. The necessary undercuts having been made for its retention in the vulcanite wall of the box, it was then embedded in the wax mould in a suitable position. A screw of aluminium was then made to fit the thread, extending outwards from the wax so as to hold the aluminium in position whilst in the plaster. The wax mould was then flasked in the usual manner, the smoothest surface being kept uppermost. The wax having been washed out, a solution of rubber in chloroform was painted round the edges of the mould, care being taken to cover up the metal parts. One layer of rubber was then inserted in the mould, and to facilitate the compression of this rubber against the walls of the mould, a wet cloth was placed

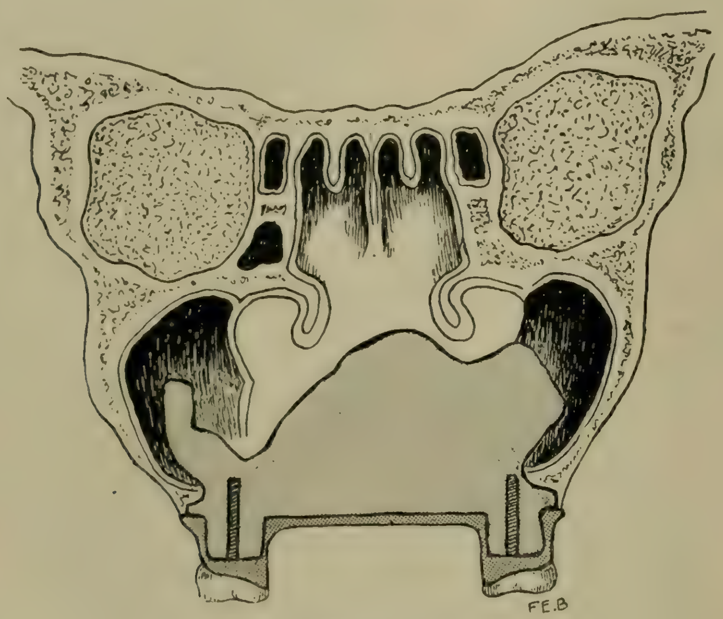


FIG. 24.

Coronal section showing prosthetic apparatus in position.

over the rubber and compression made by filling the centre of the mould with wet asbestos. The two halves of the flask were then screwed up, and extra pressure obtained. The flask was then opened repeatedly until just sufficient rubber was present, all overflow being removed, and numerous small gateways made. At the last time of opening the flask, the wet asbestos and cloth were removed, and just sufficient silver sand inserted to replace the asbestos. The box was then slowly vulcanized, and when it was taken out of the vulcanizer, the aluminium screw was removed, and the silver sand shaken out. A vulcanite screw was then made to replace the aluminium screw and filed flush with the surface of the box. Very little further work was necessary, as polishing plates were used as far as possible.

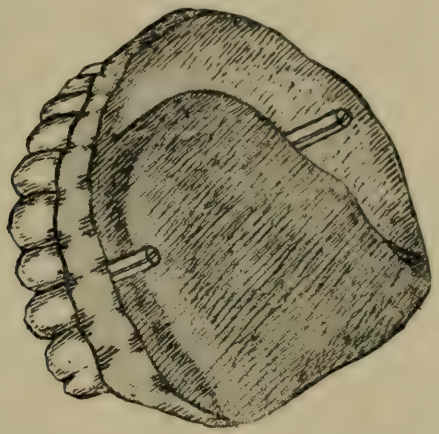


FIG. 25.

View of denture showing means of attachment to prosthetic palate.

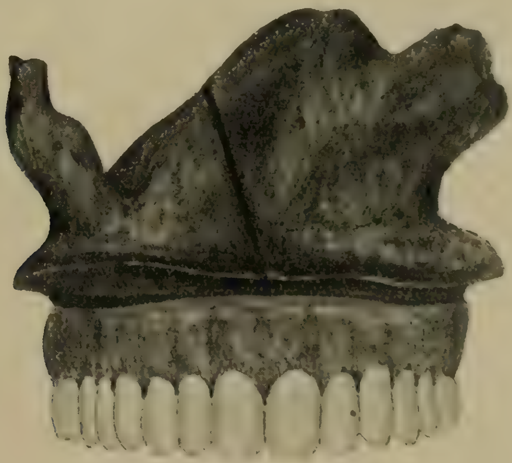


FIG. 26.

Complete prosthetic appliance.

It has been my wish to convey to you the general principles underlying the treatment of these cases rather than to describe in detail the construction of unique dentures, and to illustrate the great value of prosthetic appliances, and the wide field now open for their use in the treatment of diseases and injuries of the maxillæ.

It is quite obvious that it is only by the dental surgeon working in co-operation with the operative surgeon that the best results can be obtained, and I have been fortunate in this respect in having as my colleague Major H. D. Gillies, R.A.M.C., who has performed all the operations referred to in this paper (except where otherwise mentioned), and who has worked in the closest co-operation with me in our endeavours to restore as far as possible the powers of mastication to their normal condition.

Ht. 17.

Section of Odontology.

President—Mr. G. G. Campion, L.D.S.Eng.

Experiences with Transplant Grafts in Ununited Fracture of the Mandible.[1]

By C. Ernest West, F.R.C.S.

The group of cases which forms the basis of the present paper numbers eighteen, the whole of the jaw cases under my own hands at the First London General Hospital which were treated by the method of transplant grafting. In addition a small group of four cases was treated by the pedicle method, while I have operated on a further small group of long bones by the transplant method. All the jaw cases were primarily under the care of the dental surgeons visiting the hospital, and I am indebted to the great kindness of these gentlemen, Mr. Northcroft, Mr. Badcock, and Mr. Pearce for the opportunity of treating the cases, and thus for the privilege of being here to-night.

The total number of grafting operations on these eighteen patients was nineteen, one patient having a wide gap on either side with a completely floating symphyseal region. The period during which the operations took place was just under a year, April, 1918, to March, 1919. All were cases of confirmed non-union, most of them of a severe type with an interval between the fragments of over ½ in., and in some cases of as much as 1½ in. In one case the whole of the symphyseal region was missing.

In all cases the facial wounds had been soundly healed for considerable periods, at least two months, before a plastic operation of any sort was undertaken. Plastic operations on soft parts were then carried out as might be needed as a preliminary to any operation on the bone.

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[1] At a meeting of the Section, held April 28, 1919.

When possible, heavy scars near the site of a projected bone-graft operation were removed, and the locality of the scar moved by plastic operation. The operation was conducted in each case under rectal etherization, the composition of the injection being almost without exception 2 oz. of olive oil, 5 oz. of ether, and 2 dr. of paraldehyde.

Operative Technique.—The skin is sterilized with 2 per cent. iodine in spirit. The incision used is of the usual type, convex downwards, and planned so as to provide an ample covering for the graft in all directions. The platysma is taken up with the flap raised, until the lower border of both fragments can easily be felt. The ends of the bone are then directly cut down along their lower margins, and the bone bared with a raspatory on outer and inner surfaces and lower margin as is considered necessary, and for a minimum of $\frac{3}{4}$ in. from either end. Usually no attempt is made to clear the scar tissue from between the ends of the bones on account of the risk of entering the buccal cavity, which frequently dips downwards between the ends owing to the traction of scar. The surfaces to which apposition of the graft is to be made are now determined. Both fragments often show much atrophy, while the whole depth of the alveolar portion of the anterior fragment has often been lost. Thus the posterior fragment may be excessively thinned while the anterior is very shallow from above downwards. Under such conditions the use of an iliac crest graft is particularly suitable, as it enables contact to be secured with the stout lower margin of the anterior fragment and with the broad outer surface of the angle. The selected surfaces are now roughed with a burr until the cortex of the bone is removed and vascular cancellous tissue is exposed. The surfaces of contact should both as far as possible be cancellous bone. The bone is now drilled at each end to receive the silver wire sutures, two holes in each fragment, suitably placed clear of the proposed contacts. Hæmostasis, if not already complete, is now made rigorous, and the wound is temporarily closed and protected with a towel.

In the cases under consideration the graft has been taken from the rib in two cases, from the iliac crest in eight cases, and from the tibia in nine cases. The rib is removed by the usual method of resection, and the graft subsequently trimmed to shape and the inner surface of the ends shaved down with the circular saw. The iliac crest graft is obtained from the anterior part of the crest. The outer lip of the crest and the outer surface to a depth of about $\frac{1}{2}$ in. are cleared of muscle attachments. The circular saw is then taken down the middle of the crest and along the outer surface at right angles with this, and the separated portion is removed. The graft thus obtained possesses two raw surfaces at right angles with each other, and may thus be applied at one end to the lower border and at the other to the outer surface of the fragments without twisting. It is also possessed of a considerable amount of elasticity, so that it can be adapted to the natural curve of the jaw. The tibial grafts are cut after reflection of the skin and of a suitable flap of periosteum. The graft is then outlined by means of the parallel circular saw, the cuts deepened into the medulla by a single circular saw, and the ends freed. After being loosened by a few taps with a chisel the graft is now removed.

From whatever source derived, the essentials of a good transplant graft appear to be: (1) Sufficient substance to allow of satisfactory fixation. (2) Sufficient rigidity to give real immobilization. (3) A fair amount of cancellous bone which can be got into contact with the rawed surface of the fracture ends. No doubt periosteum in the histological sense is always present on all grafts, but in the tibial graft the presence of a periosteal sheet does not appear to have any influence on the survival of the graft or the firmness of the resulting jaw. Summing up the points of the three sources, it appears to me that the rib has the advantage of easy removal, it is easily adapted, has plenty of cancellous bone, and is of good depth. On the other hand the patient suffers considerably at the site of removal, and there is in my experience an unfortunate possibility of thoracic complications. The iliac crest furnishes a graft with all the good qualities of the rib except its vertical depth, with the one disadvantage that the patient always suffers a good deal of pain for several days owing to the separation of the abdominal muscles from their iliac attachments.

With the aid of a motor and parallel twin saw the tibial graft presents no difficulty in separation, but without this device it is a laborious and troublesome task. The graft itself can be made of any reasonable width, and is very rigid and strong. There is one good cancellous surface. The greatest advantage of the tibial graft is the almost entire absence of pain after its removal and the uniformly excellent course taken by the wound of the tibia in healing. The channel in the bone appears to fill up rapidly, and there is no difficulty in the patient's walking in three weeks or so. The only earlier obstacle has been an apprehensive feeling of weakness by the patient. On the other hand the rigidity of the graft makes it impossible to pull the graft to a curve, and this is sometimes a very great disadvantage.

I have fixed the graft in place in every case with silver wire, passed through the holes prepared in the ends of the fragments and surrounding the graft. Whenever possible two wires have been used at each end. They are carefully tightened up by twisting with pliers until really tight, the ends are cut off and then turned in. In one particular case a small intermediate separate fragment was secured to the bridge formed by the graft by an independent wire. The wound is then sutured and drained for twenty-four hours at its most dependent part with a glove finger drain.

The essentials for satisfactory results seem to be largely obvious. I would state them as operative asepsis, use of extreme caution in avoiding too close an approach to the buccal cavity, actual contact of cancellous surfaces, and good fixation. At the end of the operation the jaw should give the feeling of absolute rigidity.

To me the most interesting problem in this work has been the question of the fate of the graft. We have had the view put forward in this Section that the transplant graft is in all cases doomed to death and absorption, that its function is at its best to provide a dead bridge along which new bone may proliferate as the absorption progresses. I have been able to make a few direct observations. In one case, in which there was a bilateral fracture with wide loss of the horizontal ramus, the left side was first treated by a tibial graft. This wound behaved aseptically, with good resulting union. The gap on the right side was subsequently treated by an iliac graft. There was some mild infection of the wound, which did not necessitate opening it up. The wires remained *in situ*, but the graft disappeared completely, scarcely a trace of it remaining, and the gap was re-established. Complete absorption may thus take place in the presence of infection. The behaviour of these two grafts viewed in association with the difference in their circumstances re-inforces a conviction that absorption is a consequence of the death of the graft, and results in its complete ultimate disappearance like that of any other sequestrum. In another case the graft was exposed after some five months on account of a supposed mobility at the anterior end. I found the graft completely incorporated with the end of the jaw, the union having exactly the appearances of an ordinary united fracture when exposed operatively. The graft showed no evidence of absorption beyond the smoothing down of its edges, it was manifestly living and vascular bone. The graft may therefore survive and be established as a true graft. In a third case, one of two in which late mild suppuration took place around wires, the wound was re-opened. I found the graft apparently loose, and lifted out what proved on examination to be the compact cortical layer of a tibial graft. Underlying this was a firm continuous bridge of bone. In this case I believe that the relatively non-vascular cortex died, but that the cancellous bone survived and proliferated. I view the case as being exactly analogous to the separation, in a skin graft, of the superficial epithelial layers with the survival and growth of the deeper cell-layers. My own belief is that we are all of us right in various senses; that the graft may, and in fact generally does, survive as genuinely living tissue, but that it is not, in its new position, structural bone. Its conditions are those of the jumbled fragments of a comminuted fracture. They need not die; they become united to the surrounding bone, but ultimately they undergo replacement by new bone of structural arrangement, formed by all the living bone, both main fragments and loose fragments, until the original physiological structure of the bone is reconstituted. Because union implies vascularization it is important that cancellous surface should be exposed on the areas with which the graft is to be in contact.

Owing to the sudden closure of the Special Jaw Injuries Department at the First London General Hospital and my own subsequent demobilization, it has been difficult to present you with many particulars which would have been easily accessible at an earlier date. Patients are scattered, and those still under treatment are at another hospital. I have gone carefully through the X-ray plates of most of the patients, but they are so obscure and so little explanatory to those not personally familiar with the individual cases that it seems a waste of your time to attempt to present them to you. The results of this series of cases are, however, I think, fairly summarized in the following table:—

Total transplant graft operations	19
Graft survived, apparently alive	17
Graft absorbed in presence of suppuration	1
Graft partially sequestrated, union already secured	1

Extracted from Dental Surgeons' Reports.

Good union	13 grafts
Union satisfactory but with slight weakness at one end	3
Non-union at one end	1
Failure (absorption of graft)	1
Dental report missing	1

Function (*Dental Surgeons' Reports*).

"Fairly good and improving" to "complete restoration"	12
Poor at date last seen	4
Function not improved	1
No report	2

On the point of the period of time necessary for union in transplant grafts I am unable to give particulars for the whole series. I find a record made only in certain cases, doubtless in times shorter than the average. The following cases are only of value as showing the sort of period within which firm union may take place :—

Date of operation	Date at which union was observed
May 14, 1918	September 9, 1918
July 5, 1918	August 30, 1918
July 9, 1918	August 30, 1918
November 13, 1918	February, 1919

Such times will, I think, compare not unfavourably with those of any other method of grafting the ununited mandible.

Section of Odontology.

President—Mr. G. G. CAMPION, L.D.S.Eng.

Case of Gunshot Wound of the Mandible with Extensive Loss of Tissue treated by the Colyer Method.[1]

By F. N. DOUBLEDAY, L.R.C.P.Lond., M.R.C.S., L.D.S.Eng.

THIS patient, Private W., aged 36, was wounded on the Somme, on July 7, 1916. He sustained injuries to his face, chest, and right arm from machine-gun bullets. For these he was treated in a base hospital in France until September 2, 1916, when he was admitted to King George Hospital under my care. The skiagram (fig. 1) shows the condition on admission. There was an extensive loss of bone corresponding to the areas of the second premolar and first molar on the right side. The dental surgeon, under whose care the patient had been while in France, sent a letter asking particularly that the treatment should be continued as before, as he had a special interest in the case. On this account the splint was left in position until October 27 when it and the second molar were removed and a new splint inserted. This was left in position until January 11, 1917, when it was removed. Suppuration had ceased about the end of November, but no union had occurred. The remaining mandibular molar was then extracted and the posterior fragment allowed to come slowly forward, being controlled by an apparatus. By February 21 the fragments had come into apposition. The patient was then sent to an auxiliary hospital for three months, with his jaws immobilized. Returning on May 6, the splints were removed and firm union had occurred. His temporo-mandibular articulation was stiff for a few days but he soon got full use in it and was transferred to the prosthetic department for the fitting of dentures.

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[1] At a meeting of the Section, held May 26, 1919.

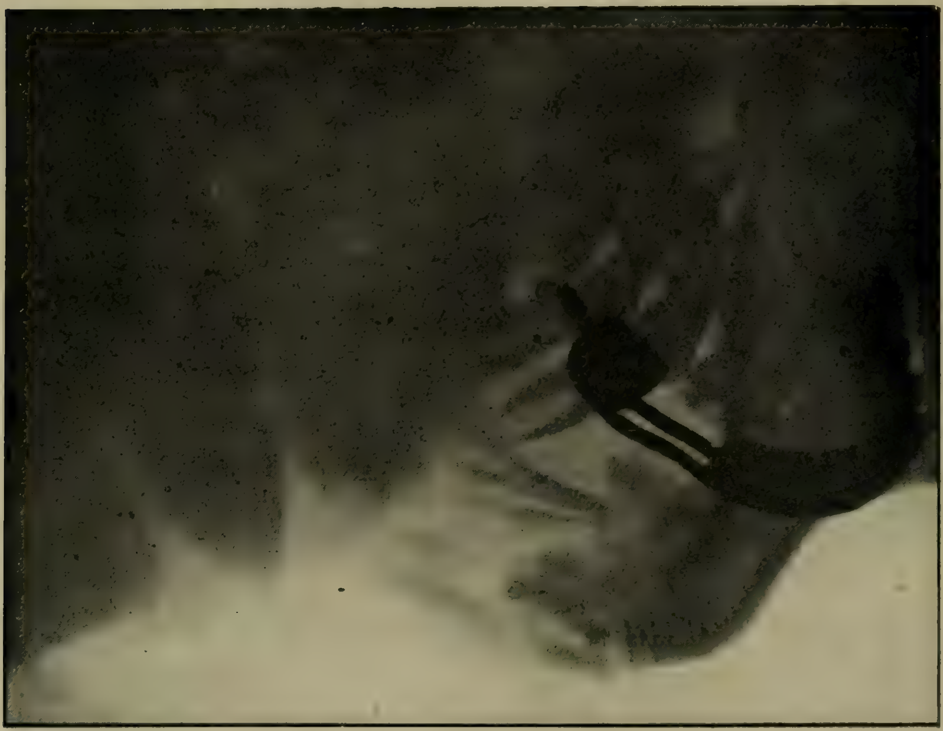

Fig. 1.

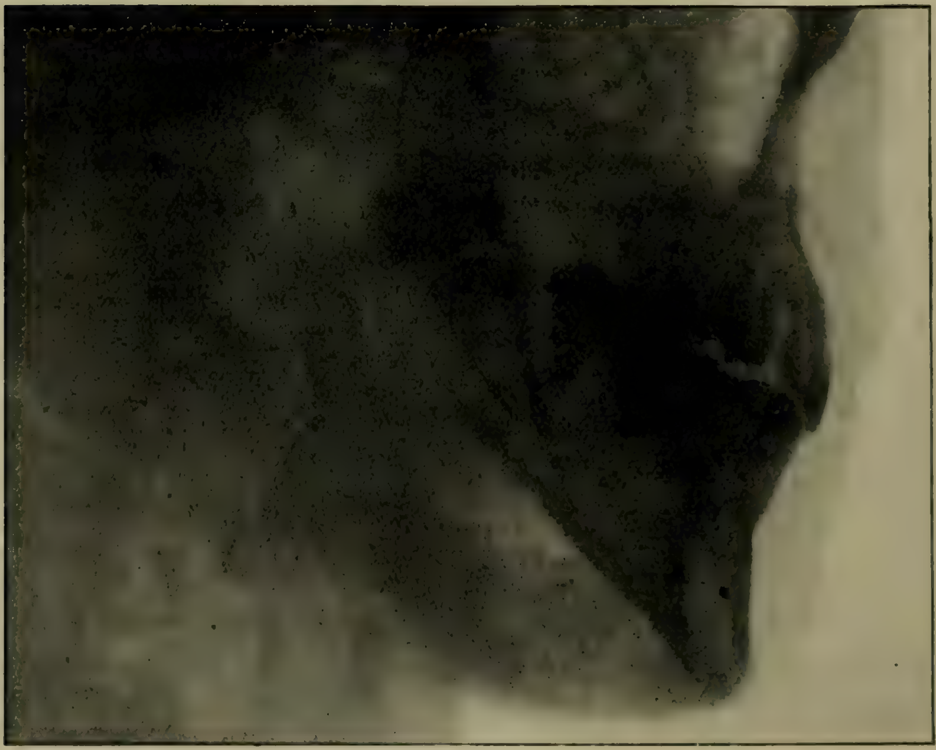

Fig. 2.

The skiagram (fig. 2) and models (fig. 3), taken on October 31, 1917, show the result of the case. It will be seen that the condyle is pushed forward half-way on to the eminentia articularis. The alveolar part of the posterior fragment is above the level of the anterior portion of the jaw and the body of the bone has firmly united with the anterior fragment. The patient had firm union, full function and no deformity. It will be seen from the position of the mid-line that the larger fragment swung very slightly back and that most of the movement was made by the small posterior fragment.

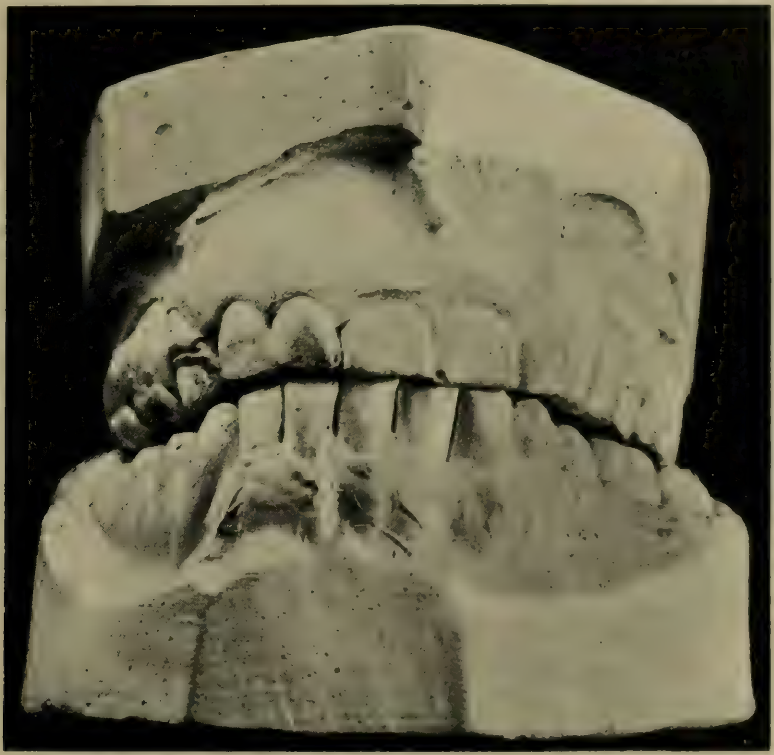

FIG. 3.

The interest in the case seems to me to lie in the fact that it is a typical one of its kind, and is of a type which is more common in ordinary times than the cases in which almost all the face is destroyed by a hand bomb or some such projectile. In this case an extensive destruction of the mandible had occurred, but it was treated in the most simple manner possible, by allowing the posterior fragment to come forward, as was first suggested by Mr. J. F. Colyer. The results were entirely satisfactory, firm bony union occurred, the functional result was good, and the improvement in deformity, as may be seen by the bite on the models, was excellent.

An Experimental Inquiry into the Bacteriology of Pyorrhœa.

By J. G. Turner, F.R.C.S., and Aubrey H. Drew, D.Sc.

In a former paper [1] some of the chief features of the general microbiology of pyorrhœa were dealt with, and this work really forms a continuation of the work then commenced. Owing to the departure of one of us (A. H. D) to Australia the work has not been carried out to the extent we hoped, when we published a short note on it in the *Journal of State Medicine* last year, and this present paper is therefore to be regarded in the light of a preliminary communication. At the outset we determined to study the following points.

(1) The occurrence of bacteria in living dental pulps.

(2) The presence and nature of the bacteria in the pulp cavities and dentinal tubules of dead teeth.

(3) The presence of organisms in cementum.

(4) The presence of organisms in the periodontal membrane.

(5) The presence of organisms in the gum.

(6) The presence of organisms in granulomata attached to dead or pyorrhœic teeth.

(7) The presence of organisms in the bone in cases of periodontal disease.

In addition to these points we determined to study the organisms found by cultural methods, and to endeavour to obtain evidence of infection by means of such pathological methods as complement fixation, opsonic indices, blood changes and agglutination. With regard to the examination of bone we have to express our thanks to Dr. Stebbing, of Lambeth Infirmary, who very kindly sent us portions of the jaws with teeth *in situ*, together with the stomach and adrenals in cases dying in the infirmary.

Technique.—With regard to the demonstration of organisms, both in tissues and bones, we were met with the great difficulty at the outset that the ordinary methods of staining were most unsatisfactory for the work and frequently failed to show organisms at all. In addition to this the usual paraffin embedding processes were frequently found to be unsatisfactory for much of the work. Nearly the whole of the sectioning has been carried out by one or other of two methods, which, if properly performed, give extremely good results. Teeth, bones and tissues have usually been fixed by at once placing them in 10 per cent. formol-saline, or in Müller's fluid ; they are then washed and cut with a freezing microtome, cherry gum being used as the infiltrating agent. The other method has been to treat with the cherry gum process described by Salkind in the *Compt. rend. Soc. de Biol.*, 1916, lxxix, p. 811. In either case the sections are mounted on slides very thinly coated with 1 per cent. gelatine, and are next exposed to formol vapour for about one minute, and then placed in 10 per cent. formol. They are then washed and stained. With regard to the staining methods a modified Gram's method, using Nile blue sulphate, has been found to be the most generally useful. Nile blue was originally suggested to us by Dr. J. A. Murray, of the Imperial Cancer Research Fund, and after a good deal of experimenting we found it was very satisfactory when used as a Gram process. Sections are fixed and cut by the methods already described, and are then stained for five minutes in dilute (1 in 10) carbol-fuchsin. They are next washed in distilled water,

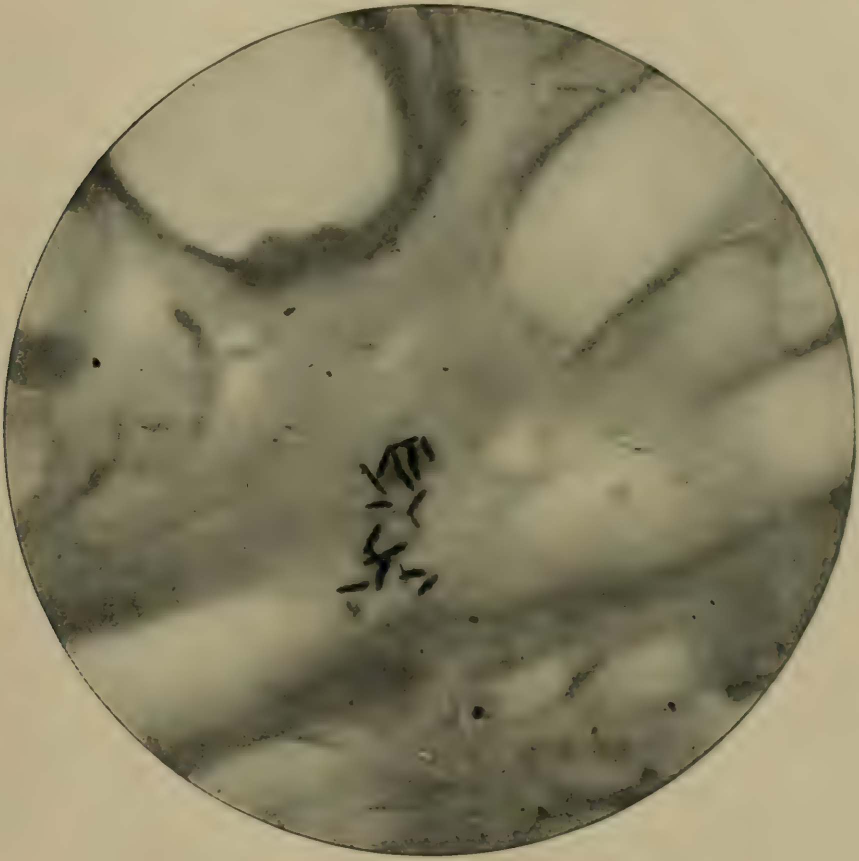

FIG. 1.

and are stained for two to twenty-four hours in a 2 per cent. Nile blue solution and again washed. The preparations are then treated with Gram's iodine solution for ten minutes, washed in water and then very rapidly decolorized in alcohol-acetone (1 in 5), cleared with xylol-phenol and mounted in balsam. An alternative method which has at times proved useful has been to stain for ten minutes in dilute carbol-fuchsin and then to wash well in water. The preparation is then stained for thirty minutes in 2 per cent. Nile blue, placed in carbol gentian violet for three minutes, and then in Lugol's iodine and decolorized in alcohol as in the ordinary Gram's method.

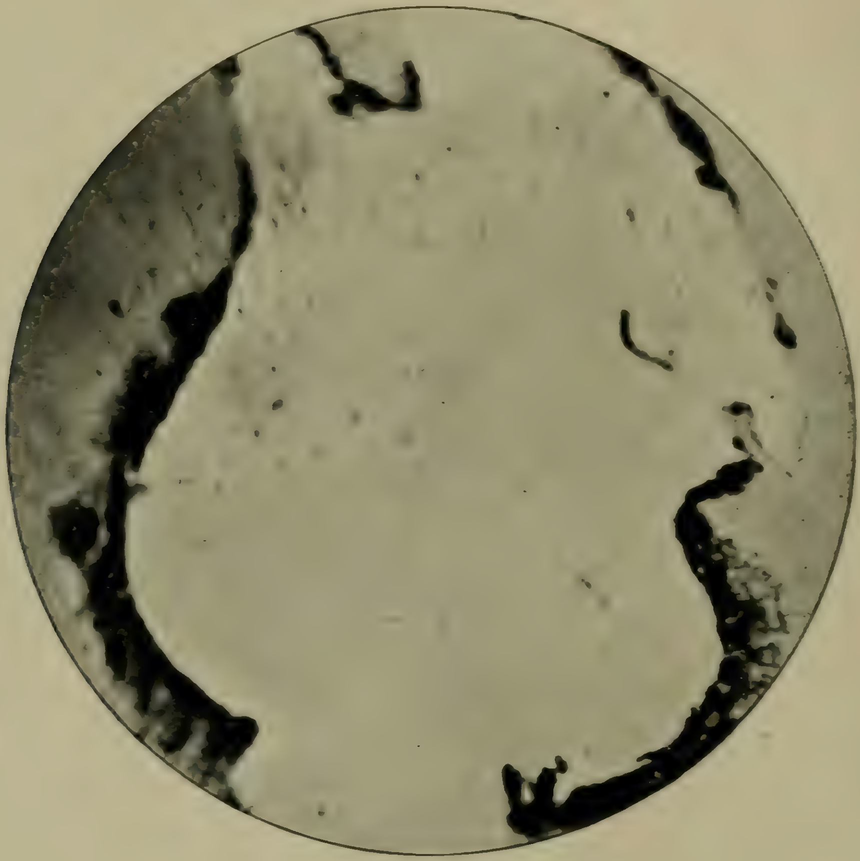

FIG. 2.

Low power.

It is not proposed to give a detailed description of all the cases examined as they run into many hundreds but to confine our attention to a selection of the most typical, and for this purpose we may take the arrangement referred to in describing the objects of the present research.

(1) *Bacteria in Living Pulp.*—The living pulp appears to become

readily infected, such infection not necessarily being associated with caries in the ordinary acceptation of the term. Fig. 1 exemplifies this in a very striking manner. The preparation is from the pulp of a worn down and stained bicuspid with chronic pyorrhœa which probably was not concerned in the pulp infection. The specimen shows a diphtheroid infection. A further case not here figured showed an infection by two distinct types of diphtheroids, a large type similar to the one figured in this case and measuring 3·5 μ to 4 μ in length, and a small type measuring 2·2 μ to 3 μ in length. Other cases have shown mixed infections, diphtheroids, streptococci, and at times spirochætes and staphylococci. These mixed infections were always associated with caries to a greater or less extent. On at least one occasion the vessels of the pulp have been found to contain organisms—viz., diphtheroids and cocci.

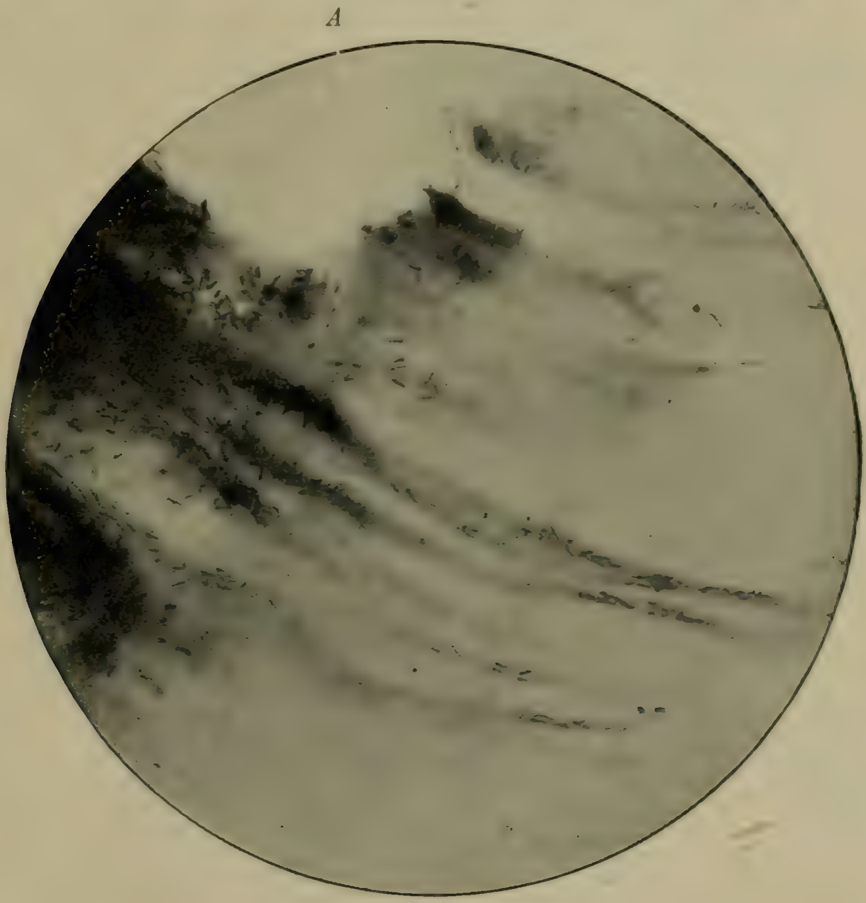

Fig. 2.

High power. *A*, pulp cavity.

(2) *Bacteria in Pulp Cavity and Dentinal Tubules.*—That the dentinal tubules are frequently infected by way of the pulp cavity is

certain. Fig. 2 shows a heavy infection of the pulp cavity by a diphtheroid, with direct extension into the dentinal tubules. While probably any organisms existing in the mouth can infect pulp, the organisms most usually associated with such dentinal infections seem to be comparatively few in number—viz., diphtheroids, cocci, and spirochætes.

(3) *Organisms in Cementum.*—The cementum frequently becomes infected, and we may distinguish three routes of infection—viz., (i) via the pulp cavity and tubules; (ii) through the periodontal membrane; and (iii) from surface caries. Fig. 3 shows an infection of the cementum by a streptococcus; in this case the periodontal membrane also showed infection, whilst the pulp and tubules were free. This section seems to show that cementum can be infected from a living, but infected, periodontal membrane. We have no sections showing the actual invasion of cementum by bacteria by way of the dentinal tubules, but fig. 4 represents a section showing its near approach. Fig. 5 shows surface

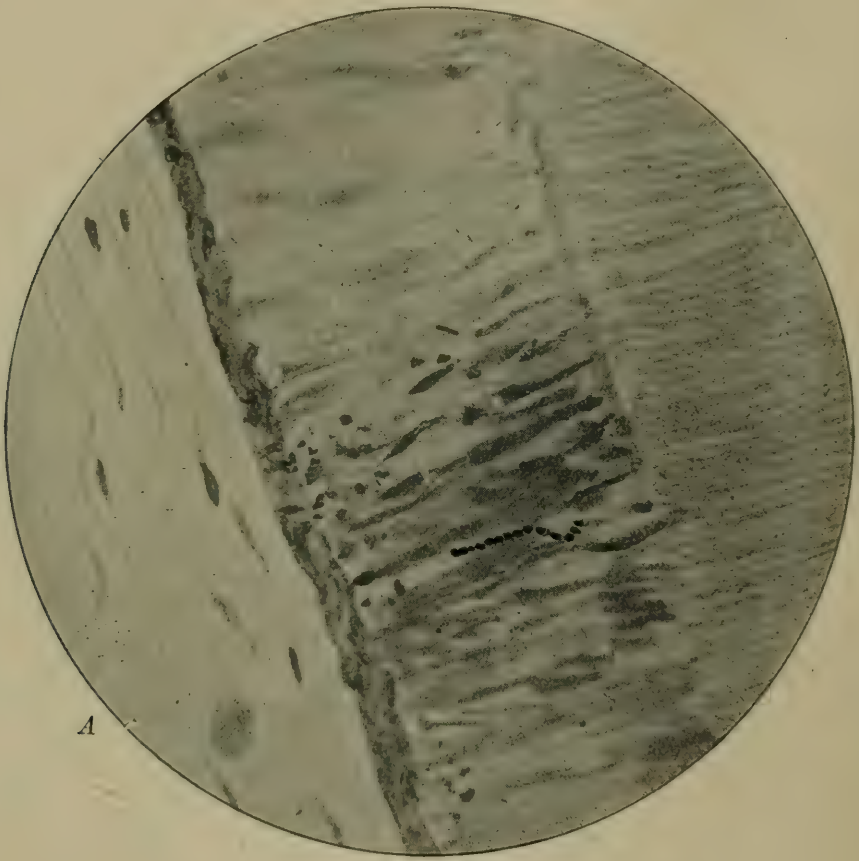

FIG. 3.

A, periodontal membrane.

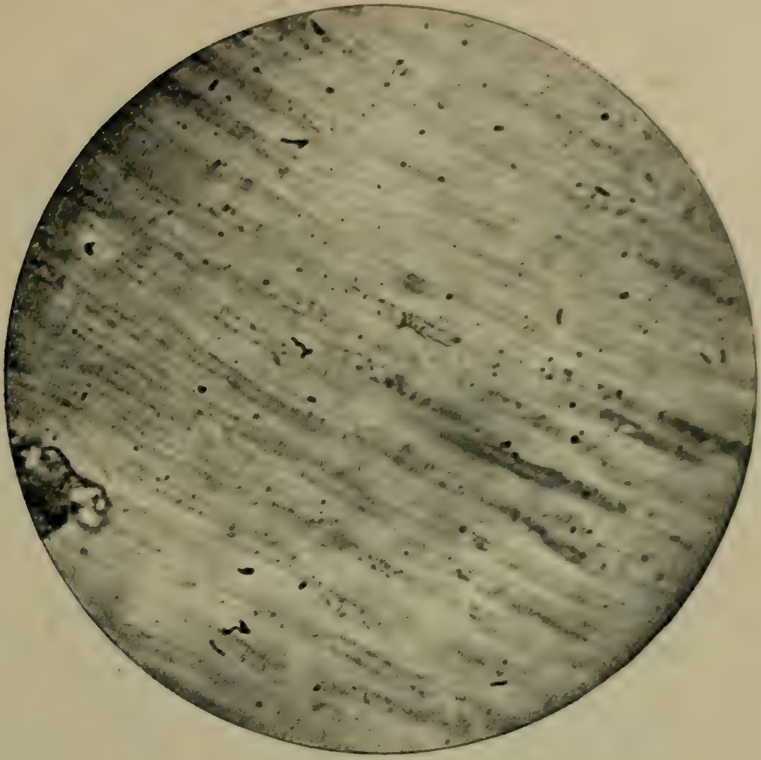

FIG. 4.

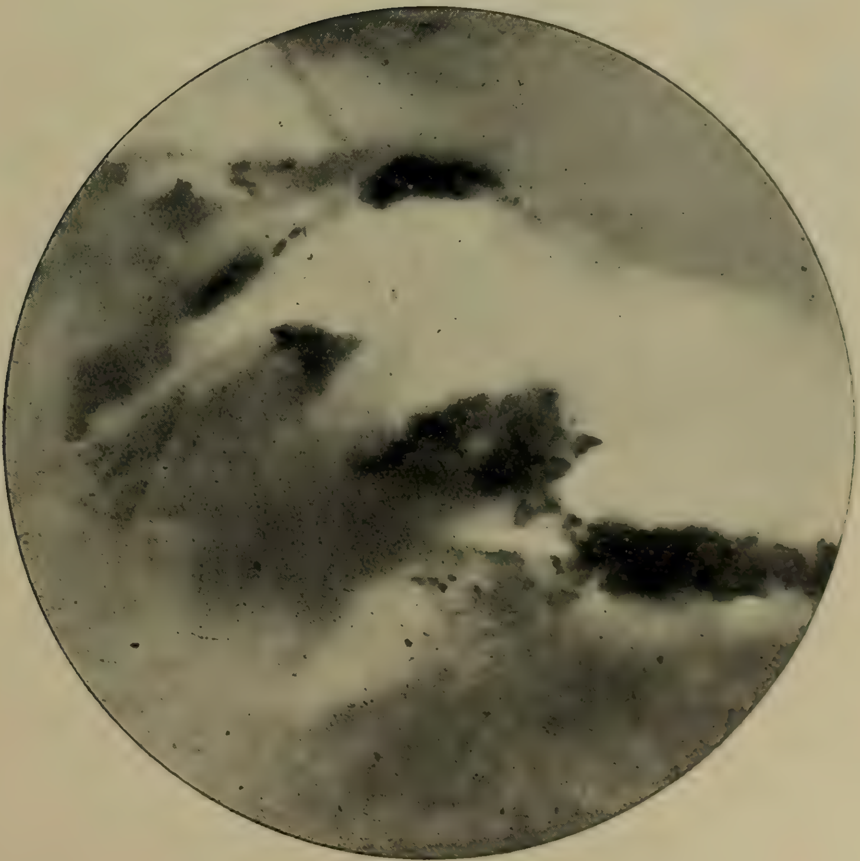

FIG. 5.

caries of the cementum. There was a thick growth of bacteria on the surrounding cement surface. This layer of bacteria is always to be found on the denuded roots in pyorrhœal pockets, and explains the difficulty of treating pyorrhœa without thorough cleaning of all such denuded roots. Fig. 6 shows this condition.

(4) *Organisms in Periodontal Membrane.*—Fig. 7 shows an infection of the periodontal membrane by a staphylococcus, whilst fig. 8 shows a diphtheroid infection. We have, unfortunately, no other photographs of periodontal membrane infections, but other specimens are shown under the microscope.

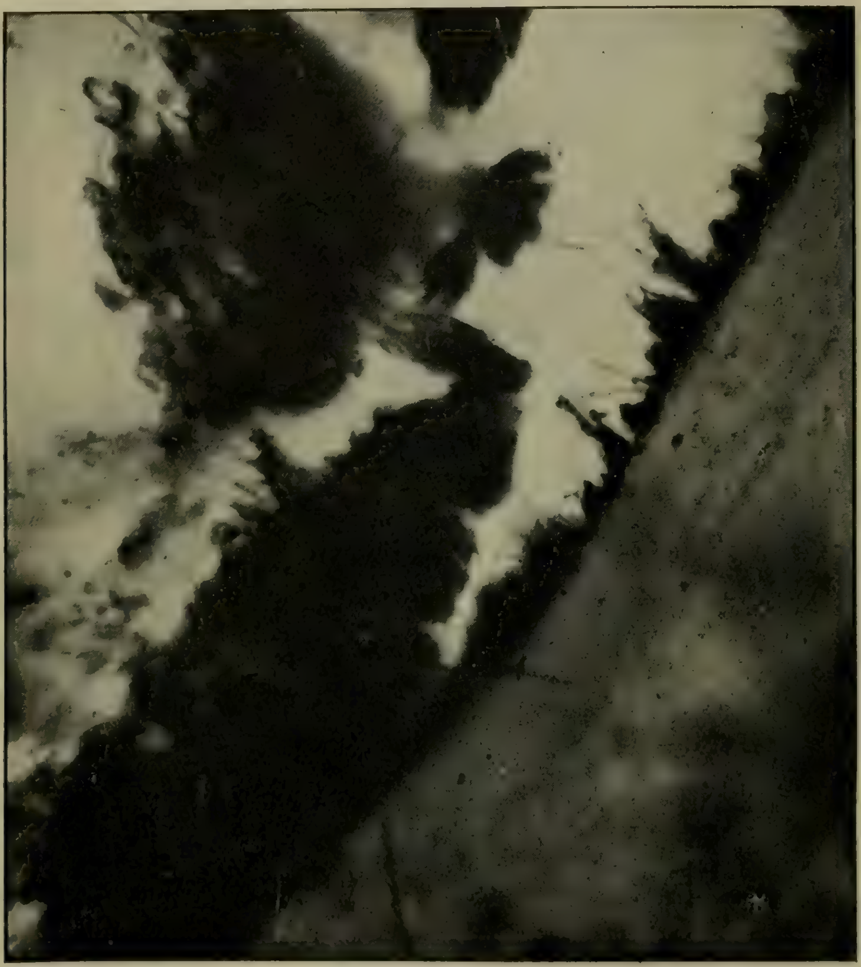

Fig. 6.

(5) *Organisms in Gums.*—Portions of gum removed from chronic cases have invariably shown the presence of bacteria, the most frequent being diphtheroids, streptococci and staphylococci, whilst on one occasion a heavy infection with a spore-bearing bacillus was found. Cultures

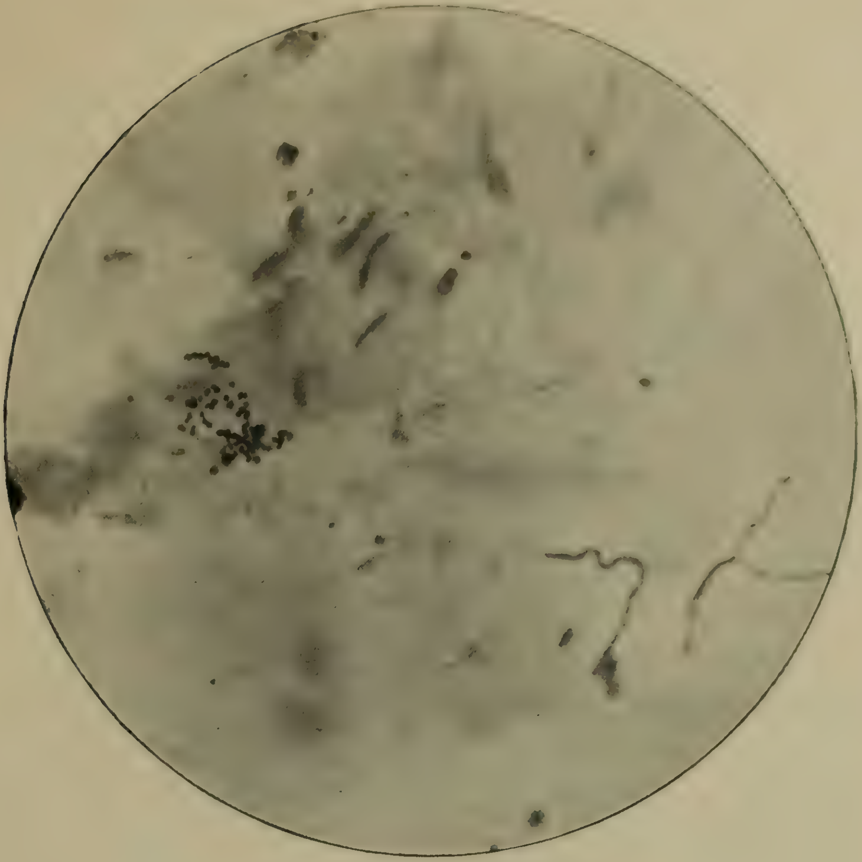

FIG. 7.

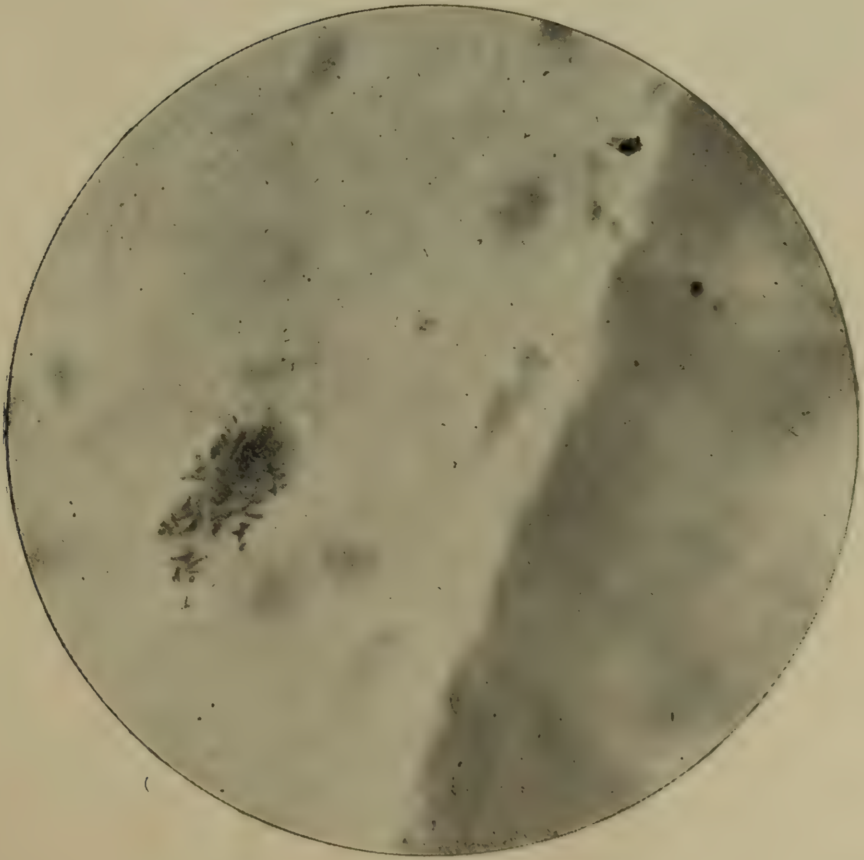

FIG. 8.

have been obtained in two cases from infected gum tissue. In one, a chronic case, a diphtheroid was grown; in the other, an acute case with ulcerating gum edges, a short streptococcus, which in culture grew into long chains, was obtained. The diphtheroid could not be distinguished from the *Bacillus septus (Bacillus coryzæ contagiosæ)*, whilst the streptococcus gave all Gordon's metabolic tests for the *Streptococcus pyogenes*. The patient's serum gave marked complement fixation in the case of the diphtheroid, but we were unable to examine the patient's blood in the case showing the streptococcus. Figs. 9, 10 and 11 illustrate these gum infections very well; fig. 9 shows a diphtheroid infection of the gum, and fig. 10 is from the case in which a diphtheroid was cultured. This case showed recurrent gastric crises, which were greatly benefited by extraction. Symptoms persisted to a certain extent, a fact which may perhaps be explained by our finding diphtheroids in the stomach wall in similar cases. Fig. 11 shows an infection of the gum with a spore-bearing organism. In this case the gum showed chronic fibrous thickening. There was no pocketing by

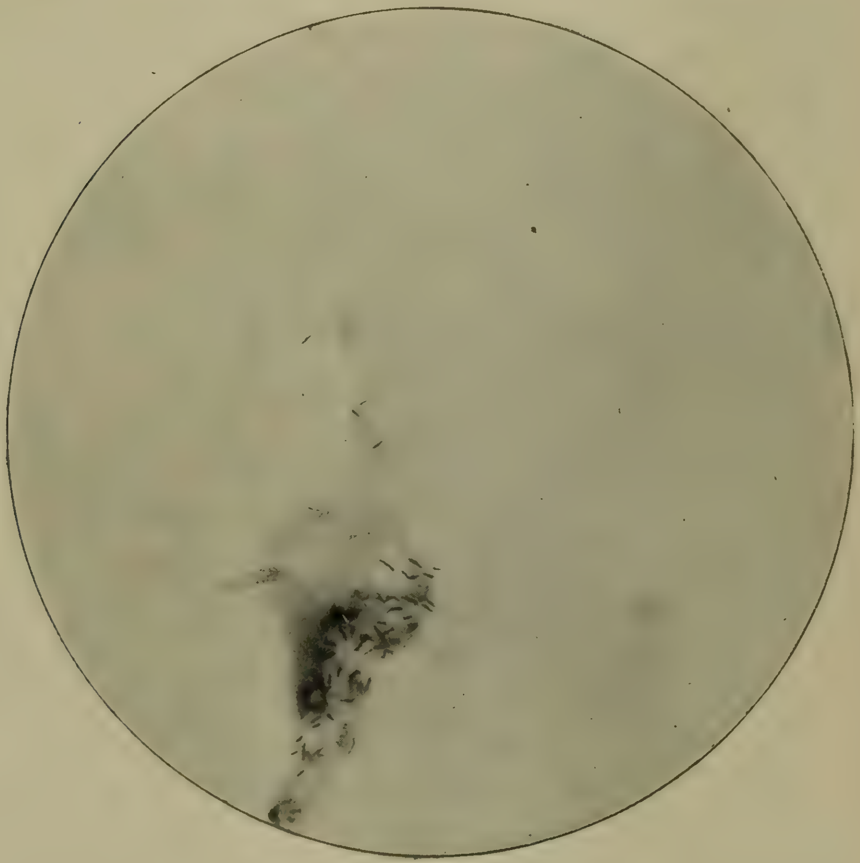
FIG. 9.

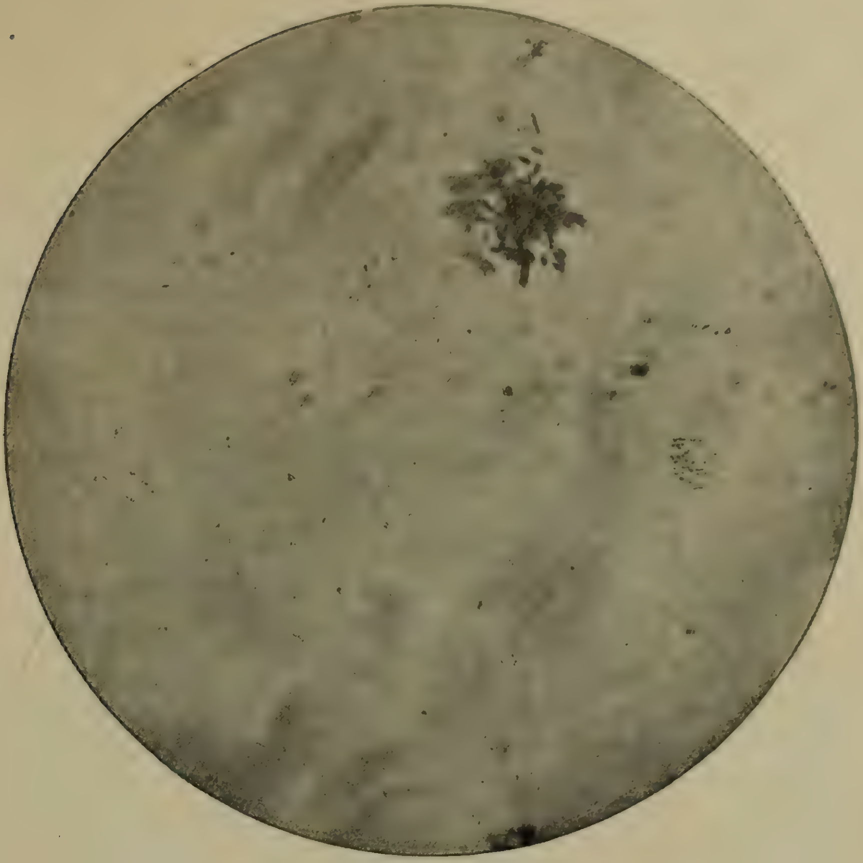

FIG. 10.

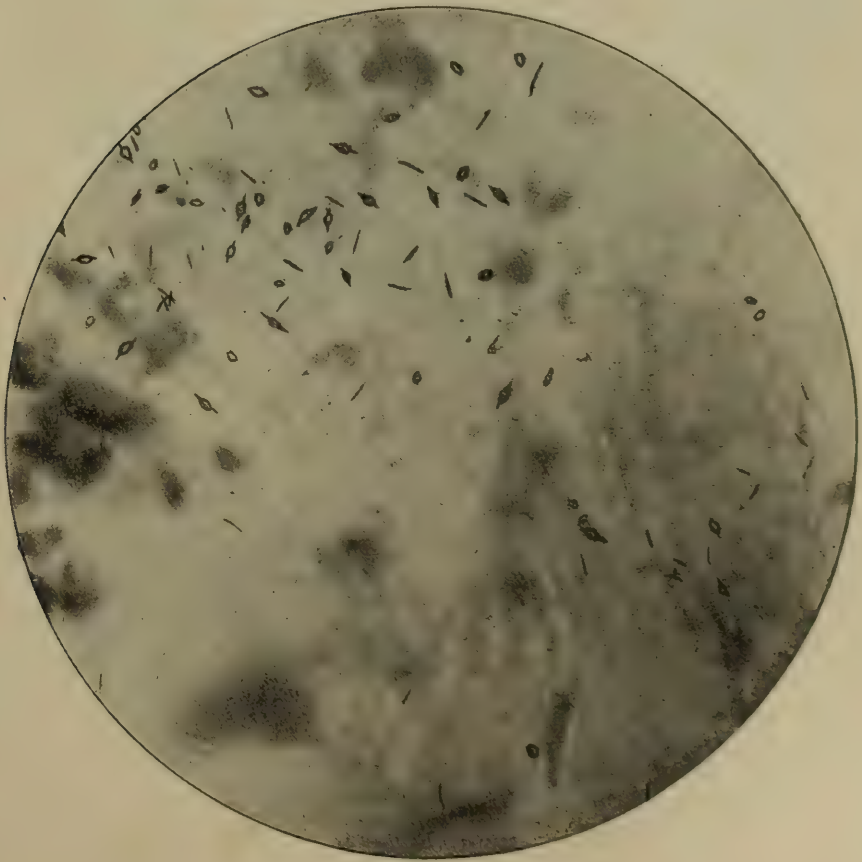

FIG. 11.

destruction of the alveolar dental membrane, but only by swelling of the gum, and no ulcer was to be seen on the excised piece of gum. Apparently the bacteria gained entrance through a merely inflamed surface. Fig. 12 is taken from the gum flap overlying an erupting wisdom tooth in a man aged 48. This specimen shows dental sepsis at its earliest possible moment—i.e., just as the gum uncovers the tooth and leaves the crypts open to infection. This supplies the explanation of teething troubles. A pure diphtheroid infection is to be seen running up the lymphatic spaces. An exceedingly interesting point in the majority of these infections is the entire absence of phagocytosis on the part of the tissues.

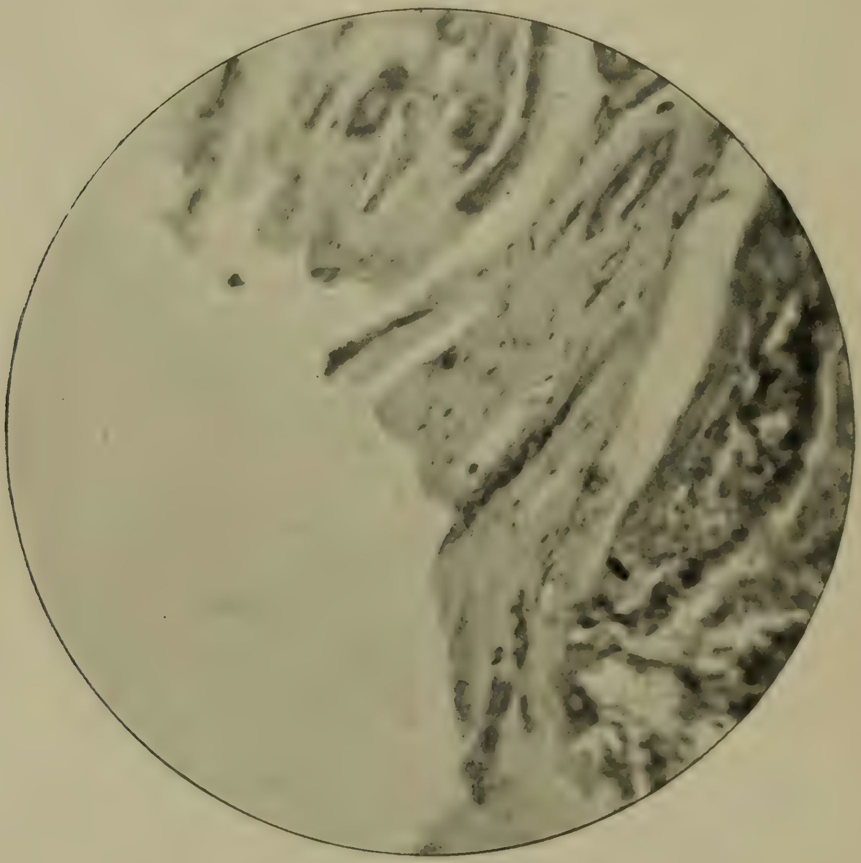

Fig. 12.

Low power.

(6) *Organisms in Granulomata.*—Sections of granulomata from the apices of teeth have invariably shown the presence of organisms. Fig. 13 shows the structure of the majority of such granulomata. Immense numbers of plasma cells together with fibrous tissue form the chief part. Polymorphonuclears and lymphocytes are only present in

small numbers, and there appears to be little or no phagocytic reaction to the bacteria. Fig. 14 shows a granuloma infected with staphylococci, whilst fig. 15 shows a diphtheroid infection.

(7) *Organisms in Bone.*—Sections through the jaws with teeth *in situ* in cases of advanced pyorrhœa have shown the presence of organisms often in very large numbers in the bone, a striking fact being the presence of bacteria within the Haversian systems. In several cases of this nature the same organisms found in the bone—viz., diphtheroids and cocci—have been found in the stomach wall, but the total number of such cases examined is not large enough to enable us to state that this condition is invariably present. (Sections exhibiting the condition were shown under the microscope.) Fig. 16 is a section of decalcified tartar showing that tartar is a mass of bacteria solidified by calcium salts.

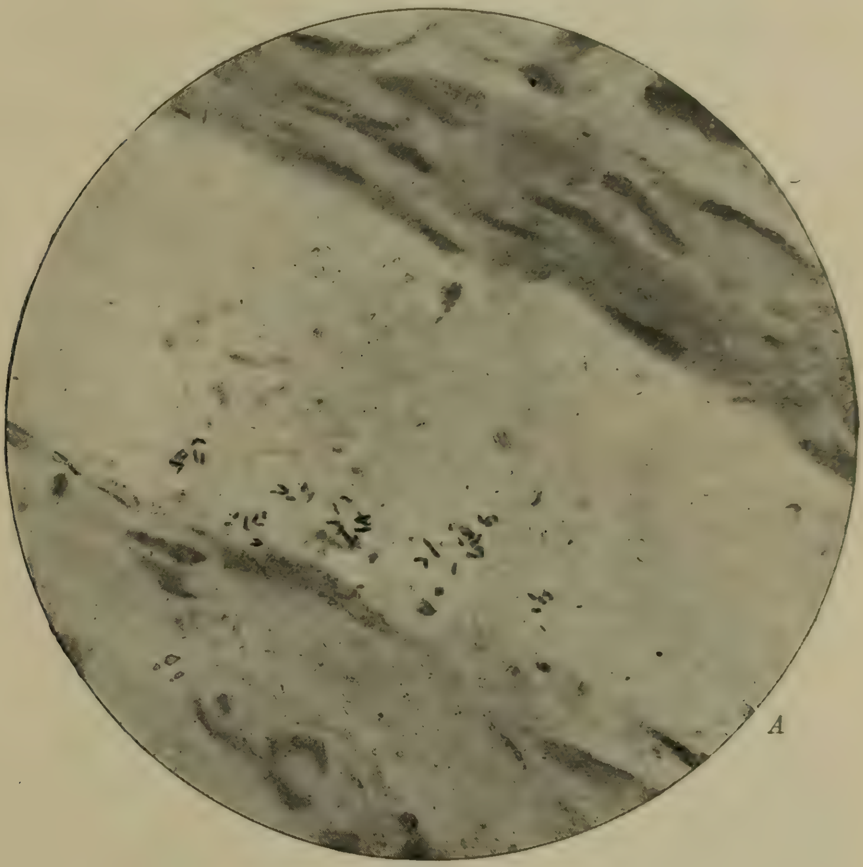

FIG. 12

High power. *A*, **lymphatic space.**

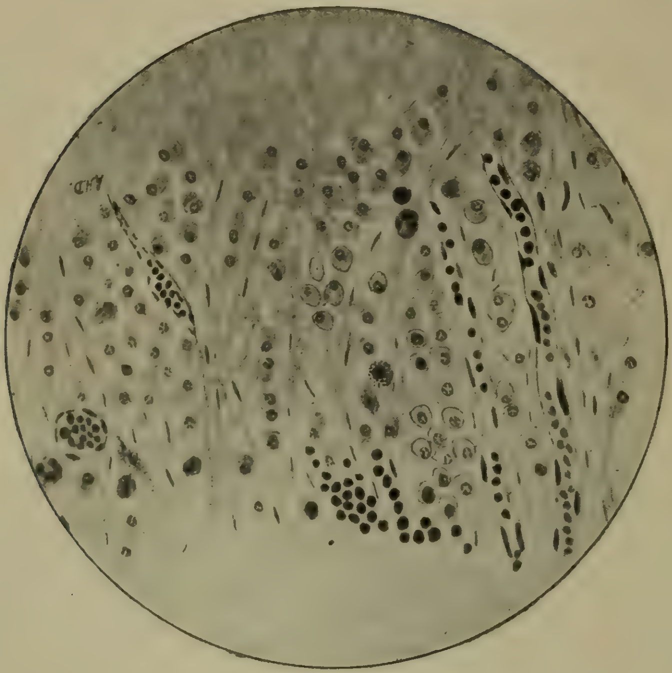

FIG. 13.

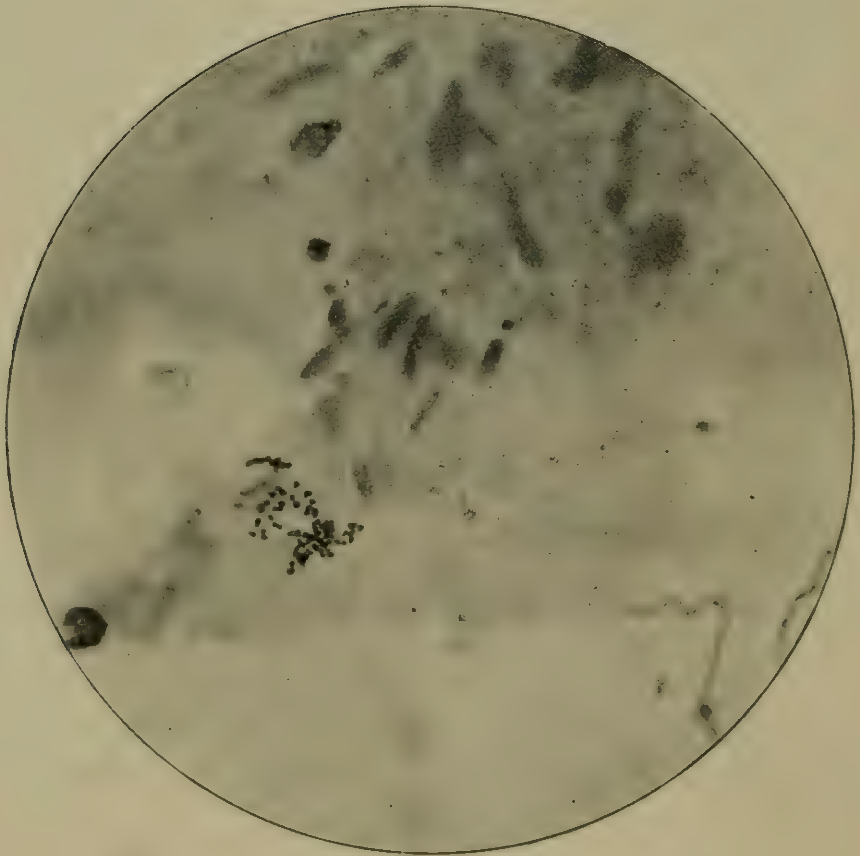

FIG. 14.

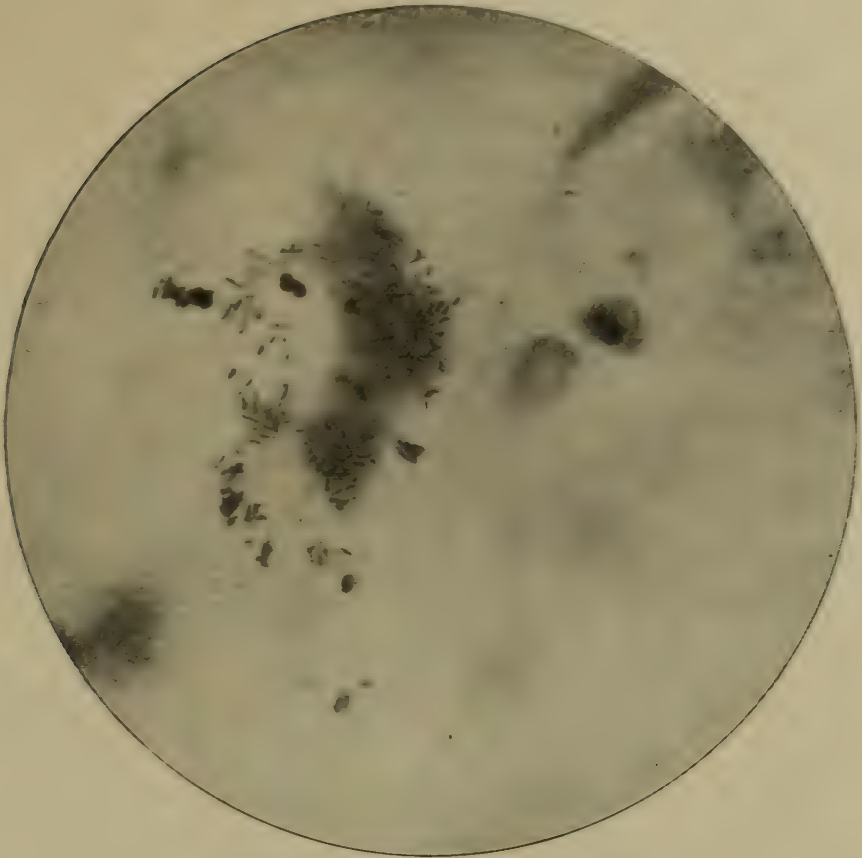

Fig. 15.

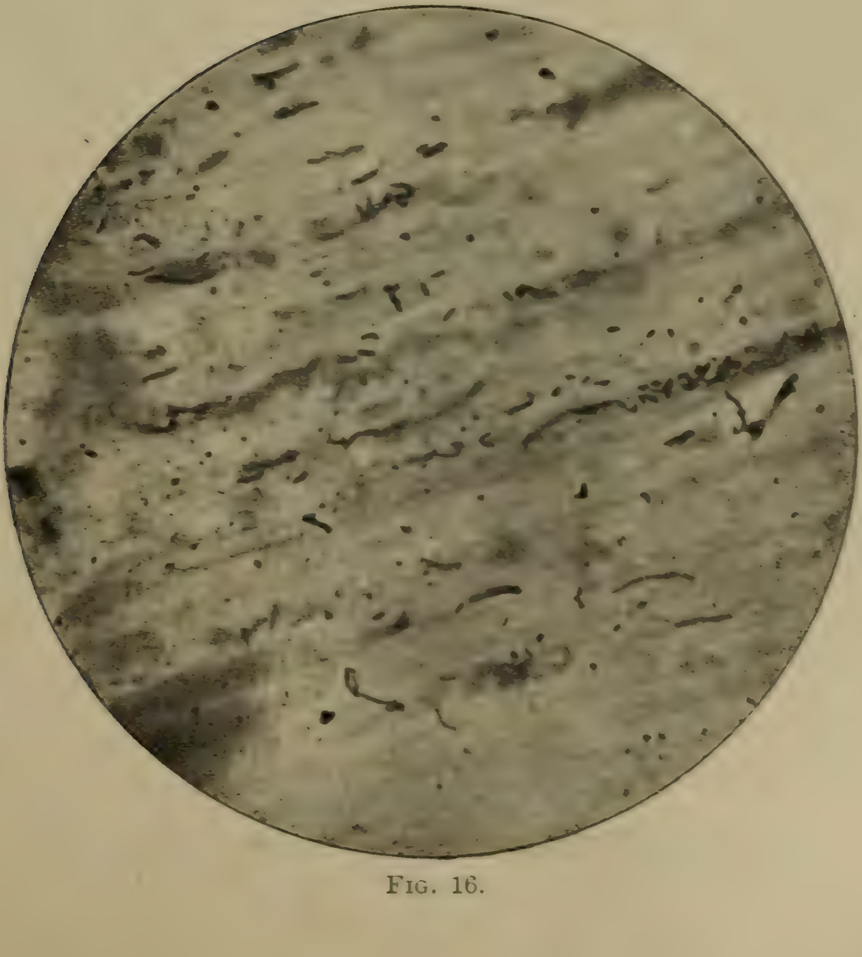

Fig. 16.

The foregoing cases will amply suffice to demonstrate the great importance of the mouth as a potential source of disease, although we have not presumed to draw any definite conclusions in the present incomplete state of the work.

REFERENCE.

[1] Drew, A. H., and Griffin, Una D. "The Parasitology of Pyorrhœa Alveolaris," *Journ. Roy. Microscop. Soc.*, April, 1917.

A Demonstration at the Odontological Museum, Royal College of Surgeons, was given at the Meeting held on June 23, 1919, by Mr. T. F. Colyer, F.R.C.S., Hon. Curator.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

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The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

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Section of Ophthalmology.

President—Mr. W. T. Holmes Spicer, F.R.C.S.

PRESIDENT'S ADDRESS.

The Formation of Clear Lines in Nebulæ.[1]

By W. T. Holmes Spicer, F.R.C.S.

[This paper is printed *in extenso*, with illustrations, in the *British Journal of Ophthalmology*, January, 1919, pp. 1-8.]

(ABSTRACT.)

A few observations have appeared from time to time in the journals devoted to ophthalmology on the presence of clear lines in old corneal scars, but no complete and satisfactory account of their origin has been given. The first observation, with an attempt at a sketch, was made in 1896 by the author: since then brief notes and sketches in large numbers have been made which have shown the essential features of all these appearances; much information was given by a rough sketch in a hospital letter by an unknown hand of eighteen years before. Inasmuch as the changes are dependent on the presence of blood-vessels in the cornea, a knowledge of the form of such vessels is necessary. The *arborescent* form occurs in superficial inflammations and represents free surface branching unconstrained by the pressure of surrounding tissues. The *terminal loop* form appears in marginal superficial inflammations, and also in the acute vascular form of interstitial keratitis in which vessels invade the cornea at all depths. The *brush* or *besom* form has deeply placed vessels constrained by the layers of the cornea in which they run, to a more or less parallel course. The *umbel* form is also a deep one; in it a single vessel grows into the cornea for

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[1] At a meeting of the Section, held November 6, 1918.

some distance without branching, till it ends in a number of radiating branches like the head of a mop, or the inflorescence of the parsley umbel.

All these small vessels are to be regarded as capillaries in which the distinction of artery and vein is retained to the final transition. It is uncommon for vessels to disappear and leave no trace; even though without blood contents they may be seen as fine silky threads near the surface or as clear lines beneath the surface. Vessels keep to their own layer in the cornea, they do not commonly communicate with those of other layers; vessels from one layer may cross those of other layers at different angles.

The clear lines divide themselves into two groups, the geometrical and the mushroom head. The geometrical lines are perfectly straight, or run in large smooth curves; they are parallel or run at an angle with each other, converging or diverging; they are very much wider than any possible vessels. They are mostly seen near the centre of the cornea, and are not visible at the periphery; as they have no visible structure, they can only be made visible by the opacity in which they lie.

The explanation of the lines is as follows. After the subsidence of an attack of interstitial keratitis attended by the presence of deep vessels in the cornea, these vessels become flattened between the layers of the cornea, and acquire a greater width than when they contained blood; at the same time a longitudinal contraction takes place along their coats, producing a straightening of their course. The effect of the vessels on the corneal tissue is an interference with its nutrition so that the cornea becomes opaque or cloudy in the region of the vessels.

The mushroom head has the appearance of a section of a mushroom carried through the side of the stalk and head, showing the stalk, and the crescentic head with gills on the concave edge. The stalk has the delicate blue colour of a primary nebula, the crescentic head has a dirty white or buff colour: the stalk is anterior to the head. The stalk is the line of scar tissue which results from a fascicular or vascular ulcer. The head of the mushroom is a secondary opacity depending on interference with nutrition and separated from the stalk by an interval of clear cornea; the gills are fingers of opacity dipping down between the areas supplied by the terminal branches of the capillary vessels.

The same condition may be seen in the form of arches of opacity in the cornea with their concavities towards the limbus, depending on a focus of scleritis situated outside the cornea altogether; it may also be seen in dermoids of the sclerotic at the edge of the cornea. The shortest time in which these secondary opacities have been seen to come is four months.

Angioma of Retina.

By HARVEY GOLDSMITH, M.D.

A SOLDIER, aged $18\frac{3}{4}$, attended at No. 8 Ophthalmic Centre a fortnight ago for loss of vision in the left eye of about six weeks' duration. He states that, when examined for the Army early in September, he saw better with the left than with the right eye, and that the examining surgeon noted this.

Present condition: Right vision $= \frac{6}{60}$ $-3{\cdot}00$D. sph. $= \frac{6}{18}$. Left vision $= < \frac{6}{60}$ $\bar{c}$ $-1{\cdot}25$D. sph. $=$ $-1{\cdot}25$D. cyl. $=$ not improved.

He has met with no accident.

The upper temporal artery on the disk is double the normal diameter; it proceeds upwards and outwards with many sinuosities, apparently increasing in diameter as it courses towards the periphery. This increase is particularly noticeable where it runs over a broad white patch, after which it is lost in a large swelling of indefinite form, the outlines of which cannot be fully made out on account of its situation so far forward. Above the artery lies its companion vein enormously dilated. This seems to proceed from the above-mentioned mass and reaches the disk in a series of wide convolutions, its tributary veins being much engorged. As to the rest of the fundus the lower temporal and nasal veins are much enlarged, their corresponding arteries showing little, if any, departure from the normal. The nerve head is hypervascular. There are several small recent hæmorrhages and patches of doubtful exudate, especially in the macular region, and pearly white patches along the course of the enlarged vessels, while a large area in the extreme outer periphery presents the appearance of a shallow detachment.

Ophthalmoscopic examination of the right eye is negative.

The picture of the case resembles in many particulars that shown by G. H. Pooley and illustrated in the Ophthalmological Society's *Transactions*, 1910, xxx, plate IX (facing p. 238).

Case of Primary Nocardiasis of the Lachrymal Gland caused by a Species of Nocardia hitherto undescribed.

By J. B. Christopherson, M.D.
(*Khartoum Civil Hospital*),
and
R. G. Archibald, D.S.O., Major R.A.M.C.
(*Pathologist, Tropical Research Laboratories, Khartoum*).

Introduction.

The disease recorded in this paper represents a nocardiasis[1] or actinomycosis, in which the causal agent is a genus of fungus, characterized by having a mycelium composed of fine bacilliform hyphæ growing readily aërobically and producing anthospores.

In all probability it gained access to the lachrymal gland by settling on the surface of the eyeball, and working its way to the upper fornix of the conjunctiva, so entering one of the lachrymal ducts.

Clinical History and Description of the Case.

On May 12, 1918, the patient, M. B., a male, aged 22, from Dongola, was admitted to Khartoum Civil Hospital suffering from a swelling of the right eye, and an inability to open it. The swelling, which was of three and a half years' duration, and was gradually increasing in size, was attributed to a blow received from a native shoe. There was, however, no visible scar.

On examination, it was found that the eyelid could not be everted, but when raised, a thick yellow discharge poured out, and the whole of the conjunctival surface of the upper lid appeared to be rough and granular, with deeper ulceration in parts. On palpation, the swelling was painless, and of a doughy consistency, but without œdema; it extended between the eyeball and the roof of the orbit, causing a bulging forward of the fornix of the conjunctiva. There were no enlarged lymphatic glands, the eyesight was intact, the eyeball itself was not invaded, nor were its movements involved, and there was neither photophobia nor lachrymation. It was therefore evident that there was an intra-orbital growth lying between the eyeball and the bony roof, chiefly extending into the upper eyelid, and involving all the structures therein, except the skin and eyelashes, and ulcerating almost the whole of the palpebral surface of the conjunctiva.

---

[1] Keratitis produced by mould fungi (kerato-mycosis-aspergillina) has been described in Fuchs's "Text-book of Ophthalmology," 4th ed. (translation), p. 259; also in Pyle's "System of Ophthalmic Practice" (Path. Bact., Collins and Mayou), p. 411.

A week after admission to hospital, the growth was dissected away under chloroform. In order to evert the eyelid, it was necessary to slit the external canthus, and so bring the growth into view. It appeared to have commenced in the lachrymal gland, and to have grown into the upper lid, invading the tarsal cartilage, and to have extended to a certain extent between the eyeball and the bony orbit along the ducts of the lachrymal gland.

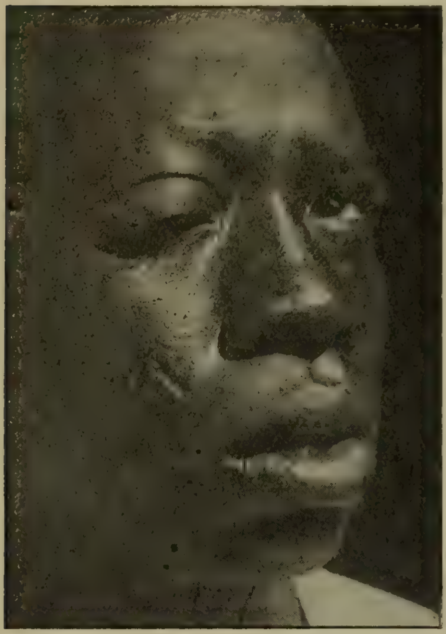

Fig. 1.

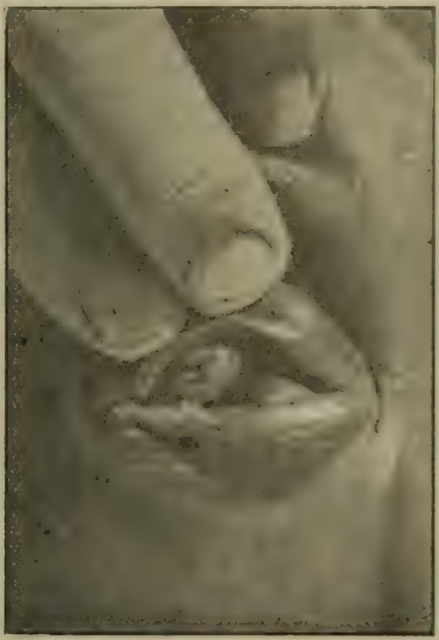

Fig. 2.

Fig. 1.—M. B., male, aged 22. *Nocardia lutea* of the right lachrymal gland. Upper eyelid swollen and firmly closed. Three and a half years' duration.

Fig. 2.—Eyelid raised with great difficulty so as to expose as much of the growth as possible. Shows eyeball pressed down; also shows eyelid invaded.

The growth itself was a flattish lobulated body about 1½ in. in length, and consisted of two ill-defined lobes, which were intimately connected; the one portion consisting of the lachrymal gland and the extension of growth into the eyelid, and the other probably consisting of a part of the growth and the orbital portion of the lachrymal gland. The conjunctiva was extensively affected.

When inspected with a hand lens the growth showed numerous light yellow gelatinous areas scattered throughout the lachrymal gland and the surrounding granulomatous-looking tissue. Some of these gelatinous areas were excised with aseptic precautions, and transferred to tubes containing sterile normal saline solution, thoroughly shaken, and emulsified. The emulsion was then examined with a lens, and found to contain minute yellow grains of a soft consistency, somewhat irregular in shape, and measuring about 0·2 mm. in diameter. These were removed with a platinum loop, and subjected to further washing with sterile normal saline solution, before being sown on suitable culture media.

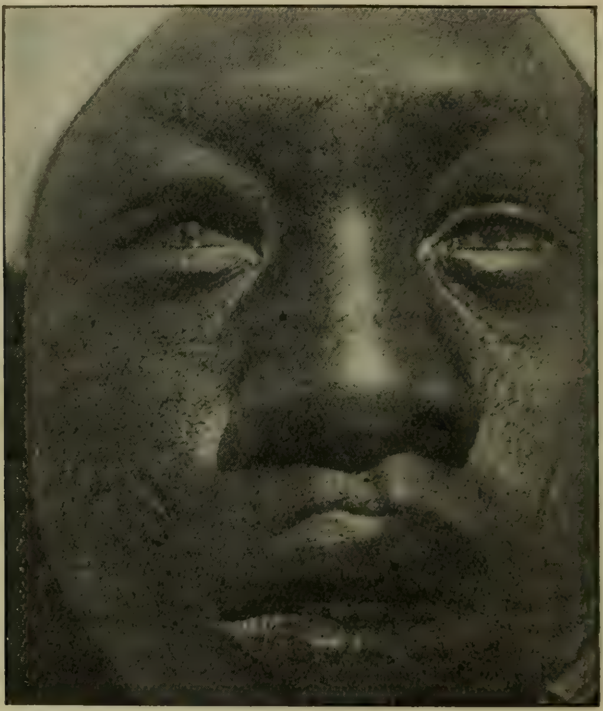

FIG. 3.

M. B., male, aged 22. After removal of lachrymal gland and growth.

The remainder of the growth was then placed in fixatives, and embedded for histological examination.

PATHOLOGICAL HISTOLOGY.

Sections showed the morbid histological changes commonly associated with a fungus infection. There was marked vitreous degeneration of the tissues, with infiltration of plasma cells, and young connective tissue cells (fig. 4), and in the vicinity of the lachrymal ducts nocardial grains could be seen irregularly distributed, but in most instances separated from the surrounding tissue by a clear unstained area (figs. 4 and 5). No sheath proper could be detected. In the tissues the grains showed little structure in detail, owing to the dense matrix present.

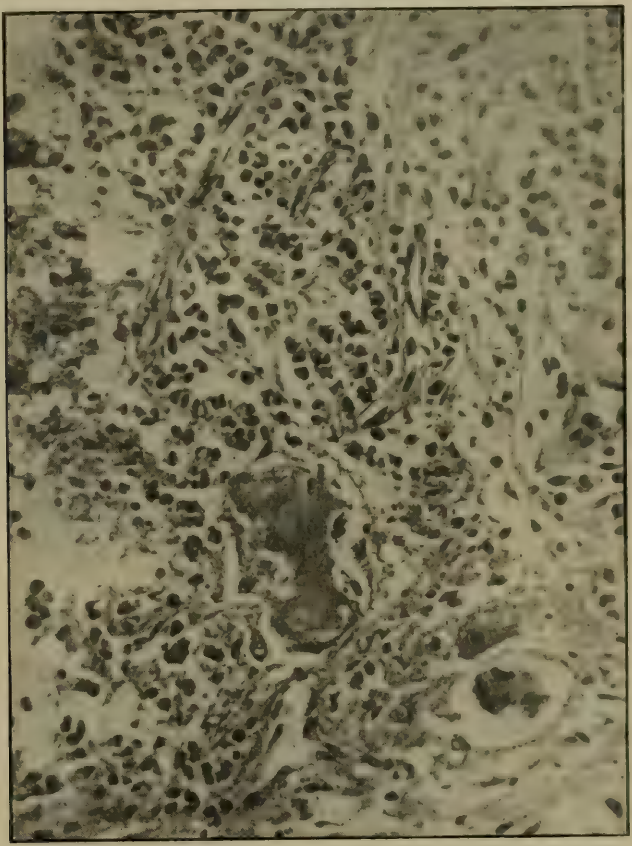

FIG. 4.

Section showing nocardial grain *in situ* and plasma cell infiltration. (× 200.)

In Gram-Weigert stained sections, numerous cellular elements known as fuchsin or Russell's bodies were found scattered throughout the gland and adjacent tissue. They retained Gram's stain, were circular in shape, and occurred singly or in clumps, and varied in size from 2 μ to 15 μ in diameter (fig. 6). Their exact nature is unknown. They have been previously recorded as occurring in actinomycosis and maduromycosis, and there can be little doubt they are fungous in origin.

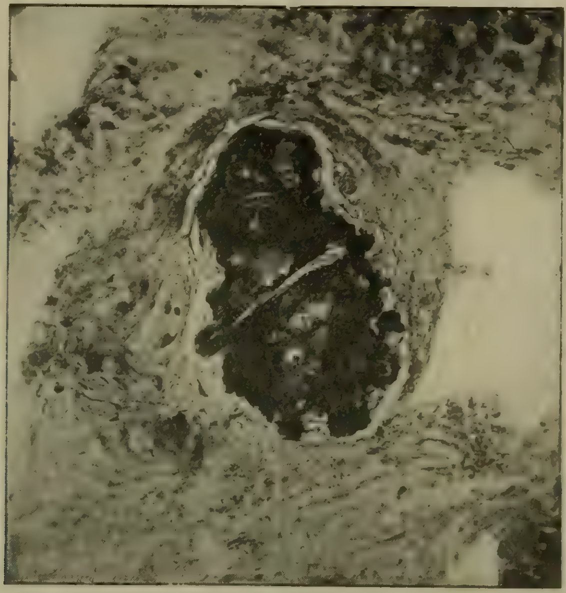

FIG. 5.

Section showing grain in lachrymal duct. (× 160.)

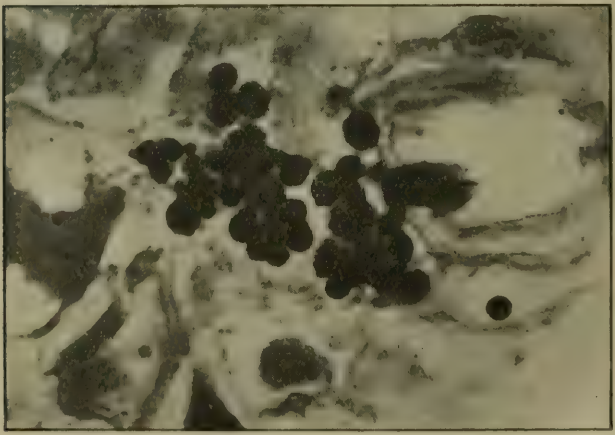

FIG. 6.

Section showing fuchsin (Russell's) bodies. (× 1,000.)

STRUCTURE OF THE GRAIN.

A portion of the grain flattened between a slide and cover-glass showed that it was composed of typical nocardial bacilliform hyphæ with rounded bodies or spores (fig. 7), the whole being held together in a dense matrix, which more or less concealed the hyphal and spore elements of the grain as seen in the tissues.

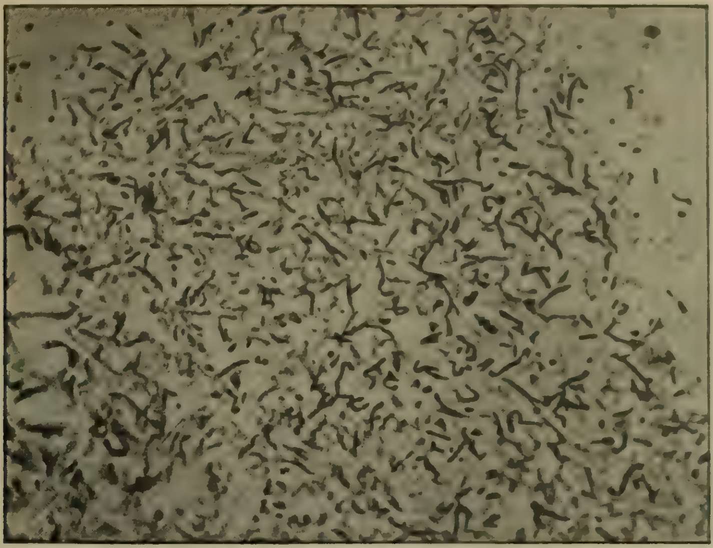

FIG. 7.

A portion of a crushed nocardial grain stained, showing bacilliform hyphal filaments and spores. (× 600.)

CULTIVATION.

When the grain was placed on suitable media growth readily occurred, and subcultures were carried out on various media. The fungus obtained from the grain was not only an aërobe, but also a facultative anaërobe. Under aërobic conditions growth readily occurred at 22° C. and 37° C., but ceased at 58° C. The optimum temperature appeared to be 30° C. In young cultures the hyphal filaments and spores were Gram-positive and acid-fast; in old cultures, however, the filaments and spores did not retain Gram's stain, and were non-alcohol fast. Well developed cultures invariably possessed a characteristic ochraceous orange colour (Ridgway's standards Plate XV, 15, YO), gave off no odour, and showed no efflorescence.

In *Sabouraud's media* a raised convoluted ochraceous orange-coloured growth was produced without pigmentation of the surrounding medium (fig. 8). In *glucose agar* an ochraceous orange convoluted growth occurred without pigmentation of the medium. In *nutrient gelatine* stab cultures at 22° C. showed a greyish-coloured villous growth along the line of the stab, while the surface growth was convoluted and of a reddish-yellow colour. Neither pigmentation nor liquefaction of this medium occurred at the end of six weeks. In *inspissated ox-blood serum* the growth was convoluted, of a yellow colour, and more viscid in character than in other cultures. Neither liquefaction nor pigmentation of the medium was present. In *peptone broth* there occurred after forty-eight hours a general turbidity with pellicle formation, and a luxuriant growth of greyish-coloured cohering flocculi, followed later by a yellow pigmentation of the medium. In *litmus milk* neither acid formation nor clotting occurred. Old cultures showed a yellow pigmentation of the medium. On *agar agar* a raised moist ochraceous orange-coloured growth with paler edges was produced, without

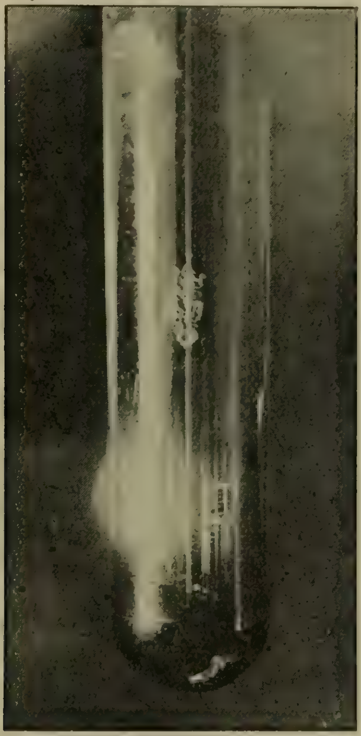

FIG. 8.

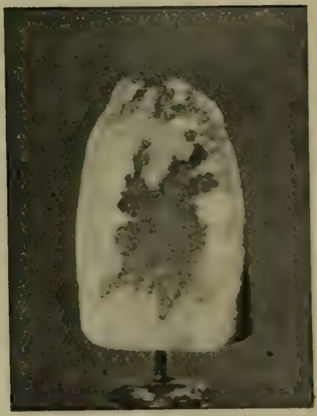

FIG. 9.

Fig. 8.—Three days old culture of nocardial grain on Sabouraud's medium showing the convoluted growth.

Fig. 9.—Culture on potato seven days old. Natural size.

pigmentation of the surrounding medium. The fungus did not show the same tendency to form a convoluted growth on this medium, as on glucose or Sabouraud's agar. On *potato* a luxuriant raised viscid ochraceous orange-coloured growth occurred with pigmentation, but no eroding of the medium (fig. 9). In *fluid sugar media* the growth was similar to the growth in peptone broth. Neither acid nor gas formation occurred in the various sugars employed.

MYCOLOGY.

Cultures showed, as in the grain, the presence of non-septate fine bacilliform hyphae with spores (fig. 10), which appear to be held together by a viscid pigmented substance apparently secreted by the fungus.

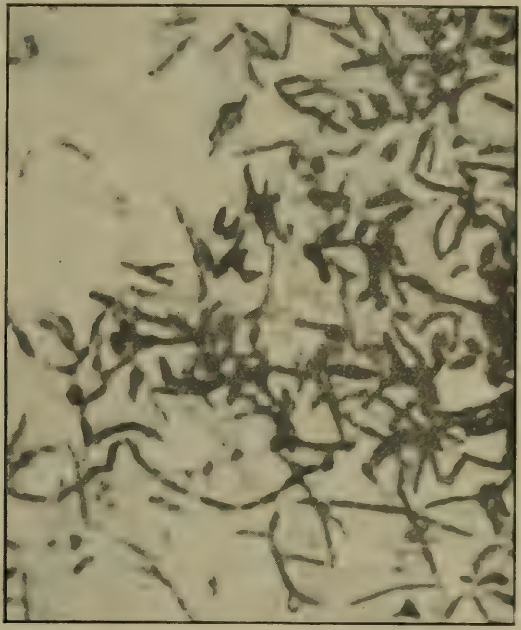

FIG. 10.

Smear preparation of a culture five days old. (× 1,000.)

Some of the hyphal filaments, more especially in older cultures showed irregular branching (fig. 11), and contained within their walls dark staining areas representing chains of spores (fig. 12), which apparently became detached or shed as the culture increased in age. Fig. 13 represents a section of a culture eight days old. Fig. 14 represents a section of a culture twenty-one days old, and shows the large number of spores with comparatively few hyphal filaments.

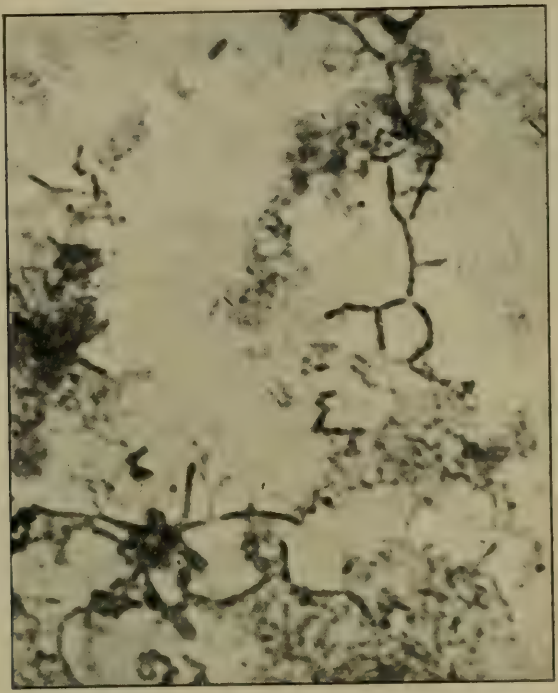

FIG. 11.

Smear preparation of a culture seven days old, showing the irregular branching of the hyphal filaments. (× 1,000.

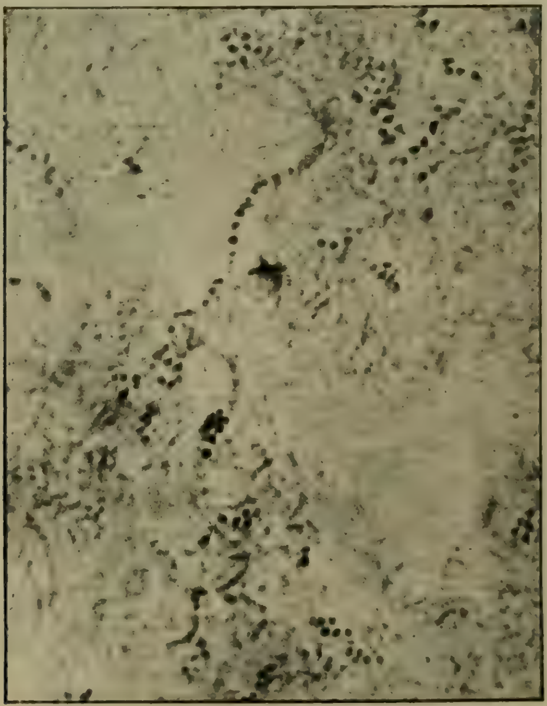

FIG. 12.

Smear preparation of a culture specially stained to demonstrate spores within the hyphal filaments. (× 1,000.)

In young cultures the hyphal filaments averaged 2 μ to 4 μ in length and 0·5 μ in breadth; some longer filaments measuring 12 μ in length were frequently present.

The spores, which apparently represented anthospores, were more or less circular in shape, and measured 0·7 μ to 1 μ in diameter.

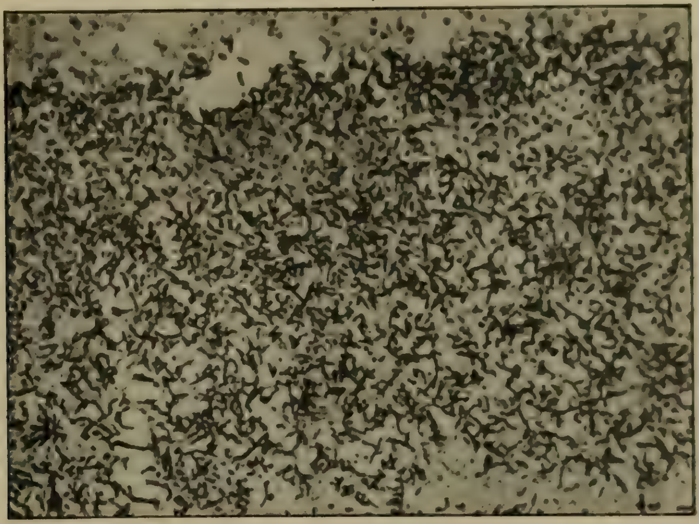

FIG. 13.

Section of a culture eight days old, showing hyphal filaments and spores. (× 300.)

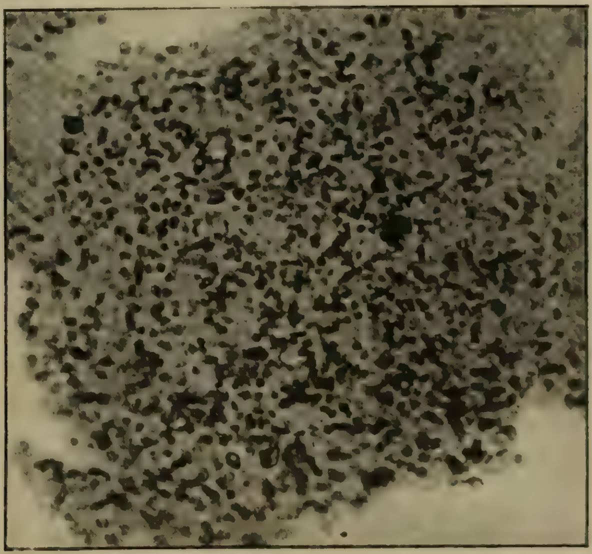

FIG. 14.

Section of a culture twenty-one days old, showing the large number of spores compared with hyphal filaments. (× 300.)

ANIMAL INOCULATION.

Experiments to prove the pathogenicity of this fungus have not been completed. The result of one experiment showed that it was not pathogenic for a grey monkey (*L. callitrichus*), when inoculated subcutaneously.

CLASSIFICATION OF FUNGUS.

The fungus described belongs to Fuckel's class of *Fungi imperfecti* order *Microsiphonales*, genus *Nocardia* (De Toni and Trevisan 1889), section *Parasitica* (Foulerton 1910). It appears to be a new species and does not correspond with any fungus described in the literature available here. Recently Chalmers and Christopherson recorded a new species of nocardia, *Nocardia convoluta*, as occurring in the Sudan. *Nocardia convoluta*, however, differs from the above described fungus in: (1) Being non-acid fast, (2) liquefying inspissated ox-blood serum, (3) producing efflorescence, (4) producing buff-coloured growths.

CONCLUSIONS.

The fungus from this case represented a nocardia which was found parasitic in man. In young cultures it was Gram-positive, acid-fast, and did not show club formation. It was readily cultivated, growing aërobically and anaërobically, without odour or efflorescence, producing ochraceous orange-coloured growths, which were convoluted on Sabouraud's medium, glucose agar, gelatin and blood serum. This nocardia neither liquefied gelatin nor inspissated ox-blood serum, produced no diastatic action on sugar media, and did not ferment milk.

As far as it is known it represents a species of nocardia new to human parasitology, and in view of its characteristic ochraceous orange-coloured growths in cultures the name *Nocardia lutea* (Christopherson and Archibald 1918) is suggested.

Lieutenant-Colonel R. H. ELLIOT, I.M.S.: There appears to me to be one feature of special interest in the paper. Actinomycosis is an extraordinarily common disease in Madura, which is a strong endemic centre of the disease, and as Madura is in the Madras Presidency and close to the Presidency Town, I saw many cases of it, but during the whole time I was in Madras I never saw a case of actinomycosis in the eye or in any part of the orbit. If that region had been at all commonly attacked, one would have been sure to have seen cases of it. Both orange and black forms of actinomycosis are common in Madura, and I think it must be an extraordinarily rare event for it to attack the eye or its appendages.

Section of Ophthalmology.

President—Mr. W. T. Holmes Spicer, F.R.C.S.

Folds in the Internal Limiting Membrane of the Retina.[1]

By A. C. Hudson, F.R.C.S.

J. C. T., male, aged 20. Wound of right eye and temple by piece of shell, October 15, 1918; right eye enucleated the following day. Total blindness of left eye for a week after injury, with gradual recovery of vision in three weeks. Subconjunctival hæmorrhage on outer side of left eye noticeable for three months after injury.

Present condition: Margins of left optic disk are somewhat indistinct; excess of connective tissue on surface of disk, with some hypervascularity. Macula contrasts strongly with surrounding retina. There radiate from it in all directions, except downwards, a series of light-reflex streaks arranged in pairs, the elements of each pair of streaks being continuous with one another through a loop just outside the macula. Below the macula is a series of similar figures having a horizontal arrangement, and a striation of the same character is faintly indicated in the retina internal to the optic disk. Vision of the eye with + 2·5 D. sph. = $\frac{6}{9}$; visual field is full, and colour vision normal.

Remarks.—I am of opinion that the condition is pathological, the result of œdema of the retina and nerve-head consequent on contusion. The fact that one pair of striæ can be seen to pass in front of a medium-sized retinal artery is of importance as evidence for localization of the light-reflex streaks in the internal limiting membrane of the retina, so also is the fact that I have observed similar streaks passing in front of a typical hole at the macula following contusion. In that case, and in a case of retinitis pigmentosa in which the striæ were well developed, the appearance was probably attributable to irregular traction. The peculiar double contour formation is exactly comparable with the appearance afforded to oblique illumination by folds in the posterior capsule of the lens after cataract extraction, and it is analogous to the phenomena of so-called striate keratitis, in which also the double contour of the grey lines is a characteristic feature.

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[1] At a meeting of the Section, held February 5, 1919.

DISCUSSION.

Mr. HERBERT FISHER: In support of the idea that the fundus changes are of new formation there is the fact that the man was definitely blind in his remaining eye for a considerable time after he was hit, and that suggests some definite lesion, probably in the fundus oculi. And as there was ecchymosis on the anterior part of the globe, the probability of central œdema is considerable. With regard to the evidences of past œdema in the head of the optic nerve, the refraction of the eye is 3 or 4 D. of hypermetropia, and the congested appearances may not be due to recent change, but may be those which are not uncommon in the hypermetropic fundus.

Mr. ORMOND: I thought, on looking at the disk, that the amount of swelling was very much greater in the upper than in the lower part of the disk, and I regarded the condition as pathological. I think a similar appearance has been recorded in Szily's book, which was published in 1916. I have seen similar conditions where there has been an injury on one side of the head, without any actual contact lesion on the other, and I looked upon it as due to the force of the blow. I think this man had a large piece of metal through the head, which caused a considerable wound. Apparently it was limited in its passage to one side of the face.

Ivory Exostosis, growing from the Roof of the Frontal Sinus into the Orbital and Cranial Cavities, removed through an Osteoplastic Opening in the Cranium by Mr. Donald Armour.

By WILLIAM LANG, F.R.C.S., and DONALD ARMOUR, C.M.G., F.R.C.S.

F. E., AGED 19, sent by Dr. Alec. Forsyth, of Chacewater, Cornwall, had been seen by Mr. Chetwood-Aiken, who diagnosed an orbital growth. When I saw the patient, a well-grown youth, on February 19, 1918, there was a displacement of the left globe forwards, downwards, and outwards, which had been noticed by the friends for six months, and diplopia had been present for three months. Vision $\frac{6}{6}$ c̄ cyl. -2 D. $_{170'}$; pupil normal, fundus normal, no limitation of movement. The roof of the orbit was depressed and felt hard. There was no pain nor discomfort, but the mother had noticed apathy and want of energy.

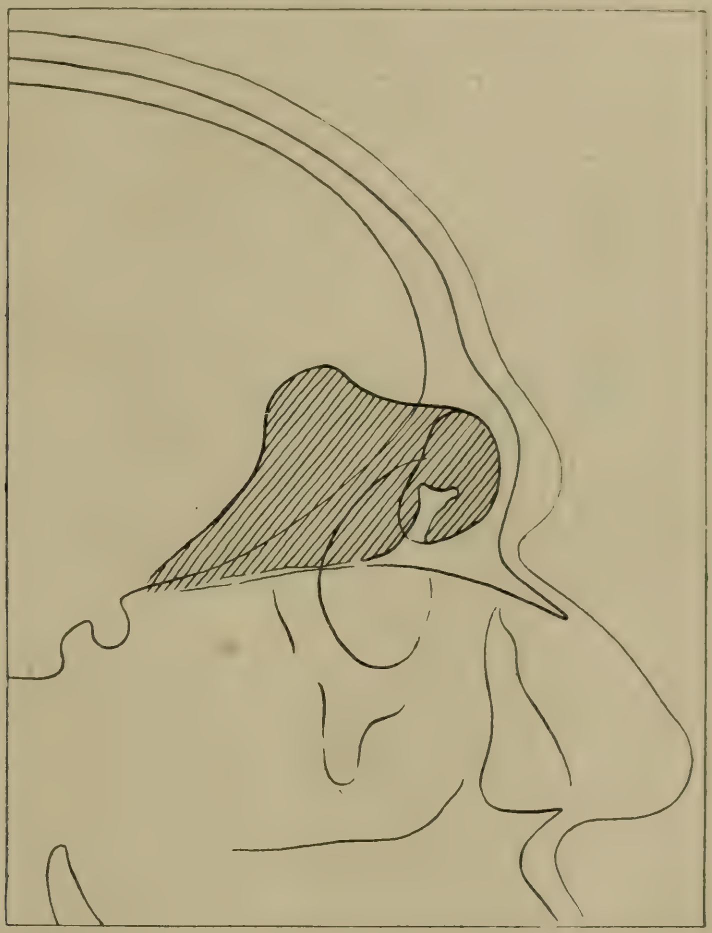

FIG. 1.

Before operation. Shaded area shows position and extent of tumour. (From skiagram.)

Dr. Peter Abercrombie found nothing wrong with the nose or surrounding sinuses, and an X-ray picture by Dr. Ironside Bruce revealed a solid mass in the orbit. In September he was in Moorfields under Mr. Treacher Collins, who recommended, after the case had been seen by his colleagues, that the growth should be removed by a surgeon skilled in cranial surgery. This was done in the National Hospital on December 7, 1918, by Mr. Donald Armour, who came to see me with the patient on January 29, 1919.

The patient's recovery was complete and perfect. The globe was in its normal position; no diplopia. Left vision $=\frac{6}{6}$ $\bar{c}$ cyl. $+\,0\cdot75$ D. $_{100^\circ}$; binocular vision, no fundus change, no headache, and the patient appeared brighter.

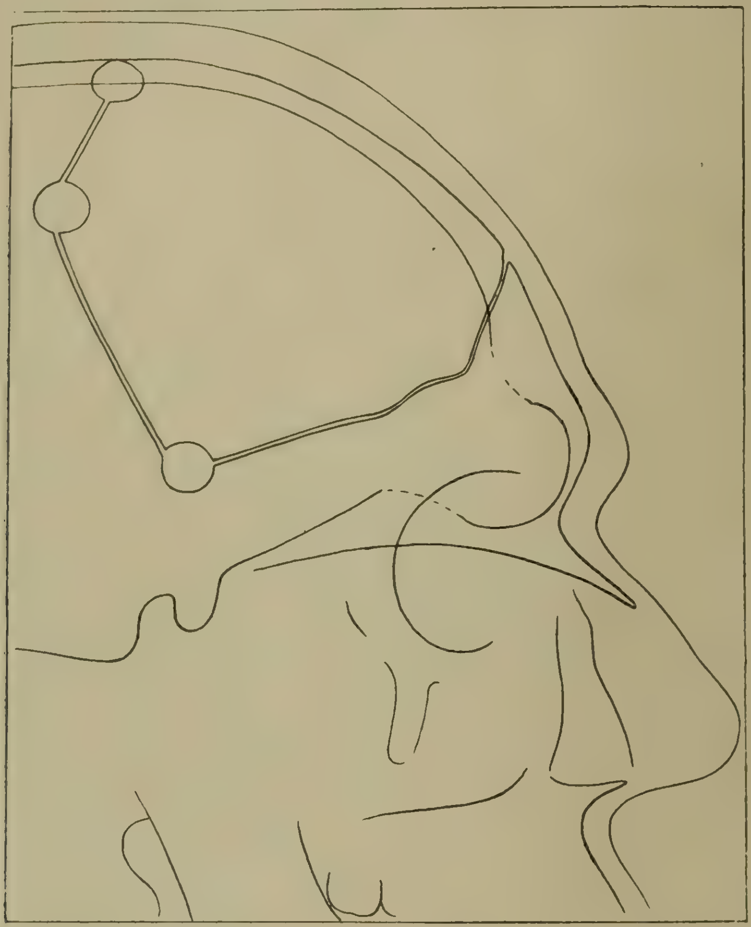

Fig. 2.

After operation. Showing lines of osteoplastic flap. (From skiagram.)

Description of the Operation, by Donald Armour, F.R.C.S.

The surgical problem in this case was one of operative approach, that is to say in what way the tumour could be reached so as to be completely removed without doing damage to cranial or orbital contents: also, at the same time, though this was of secondary importance, to avoid disfiguring the youth very much. After seeing the skiagram, I concluded that the best method was by an osteoplastic flap turned down in the frontal region, as is done in removing frontal lobe tumours. I made such a flap, with its base at the supra-orbital margin, urning down the scalp and bone together. The cranial portion of the tumour, which was pushing up the under surface of the frontal lobe covered by dura, was thus displayed. By pushing dura and brain gently back over the summit of the tumour, one could see the whole extent of its cranial portion. On examining it and testing its degree of fixity, I concluded—wrongly, as it turned out—that it was fixed to the supra-orbital margin. Therefore I sawed through the supra-orbital margin on either side of the tumour. But on attempting to remove it this wedge of bone separated cleanly from the tumour, and remained attached to the periosteum. The tumour was removed with chisel and hammer, the roof of the orbit, which was involved, being removed piecemeal by means of cutting forceps. The operation was completed by putting the wedge of supra-orbital margin back again, then replacing the bone-flap and scalp, and stitching it up. There was uninterrupted recovery. The intracranial portion of the tumour was smooth, white and ivory-like, while the other portion, below the orbital roof, was covered by mucous membrane. That, as Mr. Lang has pointed out, shows it must have been growing from the frontal sinus. There was no evidence at the time of operation that the frontal sinus had been opened. On the day following the operation, however, and for two or three days following it, the patient had an escape of blood from the nostril.

(Skiagrams shown by epidiascope.)

DISCUSSION.

The PRESIDENT: Mr. Armour's operation is a brilliant success. The contrast with the old days comes forcibly into one's mind, when ophthalmic surgeons attacked ivory exostoses from the orbit, and broke their drills and ruined their instruments in the attempt to remove them. What was the point of origin of the growth?

Mr. DONALD ARMOUR (in reply): The outer surface of it was ivory-like and composed of compact tissue. I think it started, as Mr. Lang said, from the frontal sinus, as the lower portion is covered with mucous membrane.

Case of Tumour of the Roof of the Orbit.

By J. F. Cunningham, F.R.C.S.

C. F. B., male, aged 67. He has had no pain and has only been aware of the condition for three months. There is a hard, somewhat elastic swelling apparently attached to bone, in the upper and outer part of the right orbit. There is proptosis downwards and forwards. There is limitation of movement upwards, and diplopia on looking upwards.

Right vision : $\frac{6}{24}$ + 1·0 sph. = $\frac{6}{9}$ partly c̄ + 4·0 sph. = 1J. Left vision : $\frac{6}{12}$ partly, + 1·0 sph. = $\frac{6}{9}$ partly c̄ + 4·0 sph. = 1J ; fundi normal.

Pre-auricular and submaxillary glands not enlarged, small gland in neck on the right side. There is no history of syphilis; Wassermann reaction proved negative. He was examined by Dr. Hawthorne, and no evidence of any general disease was found.

I think the tumour is growing from the periosteum, and I shall be glad if anyone will give me the benefit of their experience in dealing with these growths. A skiagram shows no affection of the frontal bone.

Mr. Donald Armour : I would operate on this case, by the same method as in my own, taking a wide sweep beyond it.

Case of Angioma of the Retina.

By E. W. Brewerton, F.R.C.S.

A. I., male, aged 26. The right eye was inflamed at birth, and sight was lost three weeks later. The eye was removed at Bradford Infirmary when the patient was aged 6, as it was much enlarged, blind, and painful. The left eye gave no trouble till 1913, when he complained of floating spots. He went to Bradford Eye Hospital and was given lotion. The fundus was not examined.

He was called up in 1917, and reported sick in Salonica at No. 50 General Hospital owing to floating spots. The fundus was not examined. In September, 1918, he was again at No. 50 General Hospital, and the fundus was examined for the first time. He was kept in hospital; drawings were made of the fundus, and the patient was sent home. He is now at the Fourth London General Hospital.

The upper half of the fundus is normal. The inferior nasal artery is much distended, tortuous and varicose, but its branches are normal. It becomes larger towards the periphery, where it is lost on the lower nasal side of an oval mass which is about twice the size of the disk. This mass is slightly swollen and of a pale pink colour, and bordered above by a dark red rim. From the nasal side of the mass a much distended vein emerges, this passes upwards in a tortuous manner, and suddenly becomes contracted just before it opens into the inferior temporal vein. Below the contraction there is some white exudate on the nasal side. The common venous trunk remains normal for a short distance, and then suddenly dilates and remains distended for the rest of its course. The vision is $\frac{6}{9}$ partly.

This is an instance of a very interesting class of case shown by Mr. Wood, of Capetown, who was one of the first to exhibit a case suffering from this disease. Cases have also been shown by Mr. Pooley and by Mr. Foster Moore in 1911. The late Mr. Coats classified these cases in a very interesting way some time previously.

With regard to the pathology of the case, it appears to be a form of cavernous angioma. I do not think the enlarged blood-vessels are diseased. It is easy to understand, if there is a cavernous angioma and arterial blood is pumping through it, that the vein would be enormously distended on the other side. I think that the vein is distended for mechanical reasons and that it is not diseased. The case of the artery is more difficult to understand. But in other parts of the body we find cavernous angiomata; they are often congenital, and they usually occur in young adult life. I think there is a congenital fault in the capillaries of part of the retina, that these capillaries dilate into cavernous spaces, causing an oval limited area of angioma, the rest being merely mechanical. The artery is receiving a better blood supply than usual. The proof that the artery is not diseased is, that any branch which it gives off is normal in size and general appearance. It is, unfortunately, the only eye the lad has got, and I fear that sooner or later the vein will begin to leak—it already shows slight exudation at one point—and that he will suffer from recurrent retinal hæmorrhage, with gradual permanent loss of sight.

Mr. A. W. Ormond: These cases are interesting on account of what may happen to the other eye. I had recently a case of a soldier, who also had but one eye, and he told me he had had the other eye removed at Derby for a growth when he was 5 years of age. The surgeon at Derby told me the eye had been removed for what was considered at that time to be a growth, but it turned out not to have been a growth. He remembered the case but could not find the records of the case. That man's remaining eye shows a condition somewhat similar to this case, except that it is more diffuse, and more like those which Coats described as massive exudation of the retina. It had the same large and tortuous veins and a mass in the extreme periphery and the white appearance which many of Mr. Coats's had also. With regard to the remark that these cases develop earlier, I think these eyes are sometimes removed because they are thought to be blind, and to be due to growths, and that trouble of a similar nature may develop subsequently in the other eye.

Changes in the Sella Turcica in Association with Leber's Atrophy.

By James Taylor, M.D.

(ABSTRACT.)

[This paper is printed *in extenso* in the *British Journal of Ophthalmology*, May, 1919, p. 193.]

Dr. James Taylor read a paper in confirmation of the suggestions contained in a paper of Mr. J. Herbert Fisher, which appeared in the *Ophthalmoscope* of August, 1916. This suggestion was that the condition known as Leber's atrophy—which often occurs at puberty, and also in later life—periods of sexual development and sexual decay—might be related to some defect in the pituitary gland—a structure which is closely connected with sexual activity. If this were so, then changes might be found in the sella turcica, and from the therapeutic standpoint, relief might be obtained by the use of organic medication. Dr. Taylor related the case of two brothers, both sufferers from Leber's atrophy. In one the condition had been present for about twelve years, in the other for only two. In both cases the X-rays showed distinct changes in the sella turcica—the changes in the case of long standing being much more extensive and marked than those in the more recent case.

DISCUSSION.

The PRESIDENT: It would be very satisfactory if we could know more about the origin of Leber's disease. It is hardly to be supposed that the changes in the sella turcica are the only cause: there must be others, and we require more observations and knowledge in certain directions especially. There was a remarkable series of observations made by Menteith Ogilvie some years ago, in which he pointed out the large number of infantile deaths in families affected with Leber's disease. What was the bearing of this?

Mr. J. H. FISHER: Naturally, this paper by Dr. Taylor is of interest to me, as I was the first to make the suggestion that Leber's optic atrophy was probably due to implication of the visual pathways by the pituitary body, which was undergoing excessive physiological changes in association with sexual variations, either of development or of decline. Since I published my paper, I have not come across other cases of Leber's disease in which X-rays reveal changes in the sella turcica, though I have encountered other cases of the disease. I have seen many cases of what would have been regarded as Leber's disease if there had been a familial history, and in which the skiagrams showed slight changes in the sella turcica. I can recall one in a woman who reached the climacteric prematurely, at 37 years of age. A year or two afterwards her vision failed, and she had the characteristic changes in the optic disks, and there was a definite change in the sella turcica. Of course there is no reason why, associated with the sexual development or sexual decline, this disease should not occur in individuals whose families show no special tendency in the same direction: sporadic cases might well be met with due to the same cause. There is, not uncommonly in the family cases, a high infantile mortality, which points to no syphilitic taint. There is no real explanation of that, but Dr. Taylor was suggesting to me that in hereditary disease large families are not uncommon; neither are early deaths. Whether that is a provision of Nature to meet the difficulty we do not know: but if it be an established fact that there is a high infant mortality in families afflicted with Leber's disease, we may in this association recall the fact that the pituitary body is essential to life; that at least in function it is intimately connected with that of sperm and germ epithelium, so that transmission of hereditary defects in it may perhaps be the more easily imagined.

Fundus Changes resulting from War Injuries.

By William Wallace, Captain R.A.M.C.

(ABSTRACT.)

A series of forty water-colour drawings illustrating war injuries of the fundus was shown by Captain Wallace, R.A.M.C. Without the drawings themselves a verbal description is inadequate, but he intends to place them at the disposal of ophthalmologists, and a full account of each will be supplied.

The drawings were made from cases in the Second London General Hospital, some discovered in the out-patient department, and others sent up by the courtesy of Major Ormond, R.A.M.C. (T.). They represented appearances seen as early as ten days after the wound, and in some instances after an interval of three years. For the purposes of the demonstration they were classified according to the extent of the visible lesion, and fell into the following groups: (*a*) Complete avulsion of the optic nerve, (*b*) peripapillar avulsion, (*c*) narrow crescentic rupture of the choroid, (*d*) gross rupture with amorphous proliferation, (*e*) star-shaped rupture, (*f*) gross peripheral rupture with concussion changes, (*g*) "holes" in the macula.

Reference was made to the rapidity with which lesions of recent date altered in appearance from day to day. One case was of unusual interest. A drawing was shown of a rupture of the choroid with the retina beyond it unchanged; then the same fundus was shown with the retina detached and thrown into numerous delicate folds—a condition which must have set in only a few hours before the sketch was made; and finally the resolution of the detachment, with the retina as seen in the first drawing. Attention was called to the almost constant presence in the grosser ruptures of isolated areas of pigmentation resembling the characters of "retinitis pigmentosa," and the speaker asked if these might not throw some light upon their occurrence in the latter disease. No opinion was expressed as to the possibility, in lesions of the fundus, of their appearance affording a clue to the nature and extent of the wound, but in three cases of star-shaped rupture the eyeball had been struck from above downwards. It was suggested that while many of the cases were beyond remedy as far as vision was concerned, the appearances, if closely studied and registered from time to time, might help to explain vascular changes which occurred during the process of repair in wounds not of themselves ocular. The severity of the lesion did not invariably indicate the probable amount of sight remaining after the wound, wide differences being found in cases which appeared to show a similar extent of damage; but allowance had to be made for changes too minute for the ophthalmoscope to detect. In one case, observed with a somewhat imperfect red-less illuminant, delicate wisps of proliferation were noted which were invisible by the ordinary means.

DISCUSSION.

Mr. MALCOLM HEPBURN: With regard to the outlying masses of pigment which Captain Wallace commented upon as being similar to those in retinitis pigmentosa: I do not think they are very difficult to explain if we regard the changes in retinitis pigmentosa as of vascular origin. If the posterior ciliary vessels are tied or cut, you see pigmentary changes in the parts of the retina supplied by these vessels. The posterior ciliary vessel supplying this particular region was probably ruptured in the injury, whereas the retina itself was not directly involved.

Mr. HERBERT PARSONS: This very valuable collection of drawings should be kept together as a permanent record of war injuries. It would be most instructive if we could get a collection of ophthalmoscopic drawings issued as an atlas some time after the war—prices are too high for this to be done now; and in course of time the drawings could, perhaps, be added to from other sources, and thus constitute a permanent record of ophthalmoscopic work during the war.

Sympathetic Ophthalmitis with Fundus Changes.

By R. FOSTER MOORE, F.R.C.S.

IN spite of very numerous perforating wounds of the eye, sympathetic ophthalmitis has been of very rare occurrence during the war, and any case of it appears to be worth recording. The present case has an additional interest from the fact that fundus changes developed during the progress of the disease and were visible throughout.

Company-Sergeant-Major D. M. G. M., aged 23, was wounded in the right eye, on May 28, 1918, by the accidental explosion of a detonator.

He was admitted to hospital on June 2, and was found to have a penetrating wound of the right globe, with prolapse of the iris and ciliary body. There was hyphæma and vitreous hæmorrhage, no details were visible with the ophthalmoscope; other small peppered wounds of the face were present. On June 4 the prolapsed uveal tissues were cut away and the wound sutured. The eye was excised on June 18.

The earliest indication of there being anything wrong with the left eye was on July 8, when the patient noticed the vision was a little misty. I first saw him on July 10.

Left eye: There was slight circumcorneal injection, slight tenderness on palpation and a very fine deep haze of the lower part of the cornea. The pupil dilated quite fully to a mydriatic, leaving no pigment adherent to the lens capsule. There was a single dot on the back of the cornea which one suspected was of the nature of punctate keratitis, and it became clear later that it was so. The retinal veins were unusually full, but in other respects the fundus was normal. The vision was $\frac{6}{6}$ partly. Tension was now normal.

In the right socket the central part around the stump of the optic nerve was so dark as to make one suspect the presence of uveal tissue. I therefore removed the stump the same afternoon under general anæsthesia, cutting through the optic nerve and preserving the portion removed. Colonel Lister kindly had this examined and found that the eye had been removed quite cleanly; there was no uveal pigment left.

On the day following there were three or four fresh spots of K.P. Lest by any chance the trouble might be due to a minute foreign body which had entered the eye at the time of the accident, and was only now beginning to cause trouble, I had him examined by X-rays and put the eye up to the magnet: both investigations were negative.

A differential blood count made by Captain W. Rolland was normal in every way, there being no increase in the large mononuclear leucocytes. The Wassermann test was negative.

July 14: There was a distinct increase of the K.P., which was all of the rather fine type. The corneal striæ had increased. Tension was −0·5. The pupil remained fully dilated, the retinal veins were engorged, but otherwise the fundus was normal. Lieutenant-Colonel Ffrench, O.C. of the Venereal Hospital, was good enough to undertake a course of "606" for the patient, and injections were given on the following dates: July 14 and 23, August 13 and 23, and September 11.

July 17: The K.P. had entirely disappeared; new vessels on the iris were first noted.

July 22: There was still no K.P. and the fundus was normal.

August 10: There was now again a considerable crop of K.P., the retinal veins were full but there was no choroidal nor retinal lesion. Tension: Soft, normal.

September 9: The iris was now more vascular, coarse vitreous opacities were present, and on this date for the first time I observed a considerable number of spots in the periphery of the fundus below.

September 21: K.P. was less; Mr. F. A. Juler kindly made the appended drawing (*see* figure, p. 31) on this date.

September 25: The spots at the fundus were unchanged. Vision under atropine, + 1·5 $\frac{5}{60}$. My note on October 6, the day before his dispatch to England was: "The eye is almost white. Tension normal. Vision, + 1·5 $\frac{6}{60}$, under atropine. The pupil is fully dilated, there are a number of fine synechiæ. The fundus changes are unaltered, I should estimate roughly that there are from 150 to 200 spots in view. The vitreous opacities remain."

Owing to the manner in which the injury was sustained, it was technically a self-inflicted wound, and it was for this reason that his stay in France for so long was compulsory.

Major Fenwick brought him to see me at hospital on January 15, 1919; he had had him under his care for many weeks, during which time he had greatly improved. The eye was now white, and the tension normal. The pupil dilated fully with a mydriatic leaving no synechiæ. The vision with + 1 cyl. was $\frac{6}{18}$ complete, three letters of $\frac{6}{12}$. There were present about half a dozen spots of shrunken K.P., and whilst there was a good deal of exudate in the vitreous, it had not increased since last I saw him. The spots depicted in the drawing had considerably increased, and whereas, when last I saw him these spots were present only in the periphery below, they were now present towards the periphery all round *(vide infra)*.

The following are the chief points of interest in the case: The time from the date of the wound to the excision of the damaged eye, that is the "first interval," was twenty days, and the "second interval"—i.e., the time from the excision to the first symptom of sympathetic ophthalmitis—the day on which the patient first noticed his sight was misty—was also twenty days.

The pupil was maintained fully dilated throughout the attack without trouble. The K.P. at one time completely disappeared and then appeared again. The fundus changes were first seen two months after the onset of the disease.

The Committee of the Ophthalmological Society which was formed to investigate this disease,[1] state that when sympathetic ophthalmitis sets in after enucleation of the exciting eye, it is usually mild, thus out of thirty cases complete recovery occurred in eighteen.

The present case is in accord with this finding. The Report states, that " many cases have been observed where inflammation of the retina caused almost, if not quite the first visible change, but almost without exception, disease of the vitreous, iritis, or K.P. has been noticed within a few days." In the present case, which was seen quite early, the signs were slight deep localized haze of the cornea, one spot of K.P., and somewhat turgid retinal veins.

Six cases in which retinal or choroidal changes are described were considered by the Committee, but they state that "they differ so much amongst themselves, that we should hesitate to include them all under one title, or to ascribe them all to the influence of the other eye." The justice of this comment will be appreciated on looking through the cases referred to. As remarked by Fisher (*vide infra*), these cases almost all recovered. Fisher reports an interesting case in the Moorfields Reports, vol. xv.[2] He speaks of his case as sympathetic uveitis, the most posterior segments of the tract bearing the brunt of the disease. The fundus changes were severe, the ophthalmoscopic appearances suggested general infiltration of the choroid, the veins were turgid, " in the peripheral parts of the retina are to be made out small circular dead-white spots, not glistening, the whole retina is hazy and œdematous." The tension was − 1, and the vision fell at one time to c.f. at 2 ft.

A later note says: " I see a group of circular exudative spots; the others, found mostly in the nasal half, remain unpigmented and brightly glistening." With regard to these spots, Fisher refers to a case of v. Graefe's in which disseminated spots of choroidal disease appeared towards the end of the disease, to a case of Krause's in which choroidal patches were noted in the lower part of the fundus, and to one of Galezowski's, in which the choroid had undergone change in the shape of obvious disseminated atrophic patches.

In the *Proceedings of the Royal Society of Medicine*, vii, 1914 (Section of Ophthalmology, p. 95), Lang reports a case in which he had performed extraction of the lens and iridectomy in an old sympathizing eye, and in which "extensive and somewhat superficial choroidal atrophy can be seen over the fundus." In the present case the fundus has been under observation from July 10—i.e., two days after the onset of symptoms till the present date, January 15, 1919, six months in all, and during this time it has been for the most part clearly visible, except in so far as a varying degree of vitreous exudation has obscured the view.

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[1] *Trans. Ophthal. Soc.*, 1886, vi, p. 170.

[2] *Roy. Lond. Ophth. Hosp. Repts.*, 1903, xv, p. 91.

The changes which were present form the special point of interest in the case. When first seen the retinal veins were unusually full, and there was no other change. The fundus was examined on the following dates and there was no other abnormality discoverable with the ophthalmoscope on July 10, 14, 22, and August 10. On September 9 the changes to be described were first seen—i.e., two months after the beginning of the disease. They took the form of a group of spots, scattered irregularly over the lower part of the fundus well towards the periphery; none were visible in the other parts of the periphery at this time. In colour they resembled that of the dots in Tay's choroiditis. They were quite irregular in shape, and there was no disturbance of pigment around them. In several places retinal vessels passed over them quite unobscured.

The drawing made by Mr. Juler, on September 21, represents the portion of the fundus vertically below the disk, with a portion of the lower temporal vein; the arteries are omitted. Mr. Juler was at considerable pains to include every spot which was visible in this area, and to place them accurately with relation to themselves and the vessels, with the idea that any particular spot could afterwards be identified, and any alteration in it, or any increase in the spots, could be made sure of. During the time he was in France there was no discoverable change in the spots, but on examining him on January 15 considerable changes had occurred. Whereas before, the spots were visible only in the periphery below, they were now to be seen all round, although they were much more plentiful below. There was a notable increase in the number of the spots below, and changes in the area depicted in the drawing were easily made out. The spot in the drawing immediately to the nasal side of the bifurcation of the vein below, shaped somewhat like a Wellington boot, was now represented by a group of about six irregular spots of similar type. The irregularly shaped spot, on about the same horizontal level with the above, but on the opposite side of the vein, was now represented by a cluster of five or six spots, and similarly with regard to other spots.

On the other hand the highest spot in the drawing deep to the vein was now only just visible. On seeing these spots for the first time, one might have wondered whether they were old, and not causally related to the disease, for their edges were fairly clearly defined, and there was no marked evidence of œdema of the overlying retina. It became clear, however, later, as evidenced by what has been said above, that they were an integral part of the disease.

As to the anatomical position of these spots, they were deep to the retinal vessels, and Mr. Greeves pointed out to me that at a point or two a choroidal vessel appeared exposed crossing the spot. I believe, therefore, that they were placed superficially in the choroid; there was no pigmentary disturbance in connexion with them.

It is a little difficult to judge how far these spots are to be identified with the changes described by other authors, but judging from the descriptions they might quite well be of the same nature as the changes described in the cases of v. Graefe, Krause, Galezowski, and Fisher. In all of them the changes are described as being towards the periphery of the fundus, and in the superficial layers of the choroid, and in none of them does there appear to have been any pigmentary disturbance or proliferation.

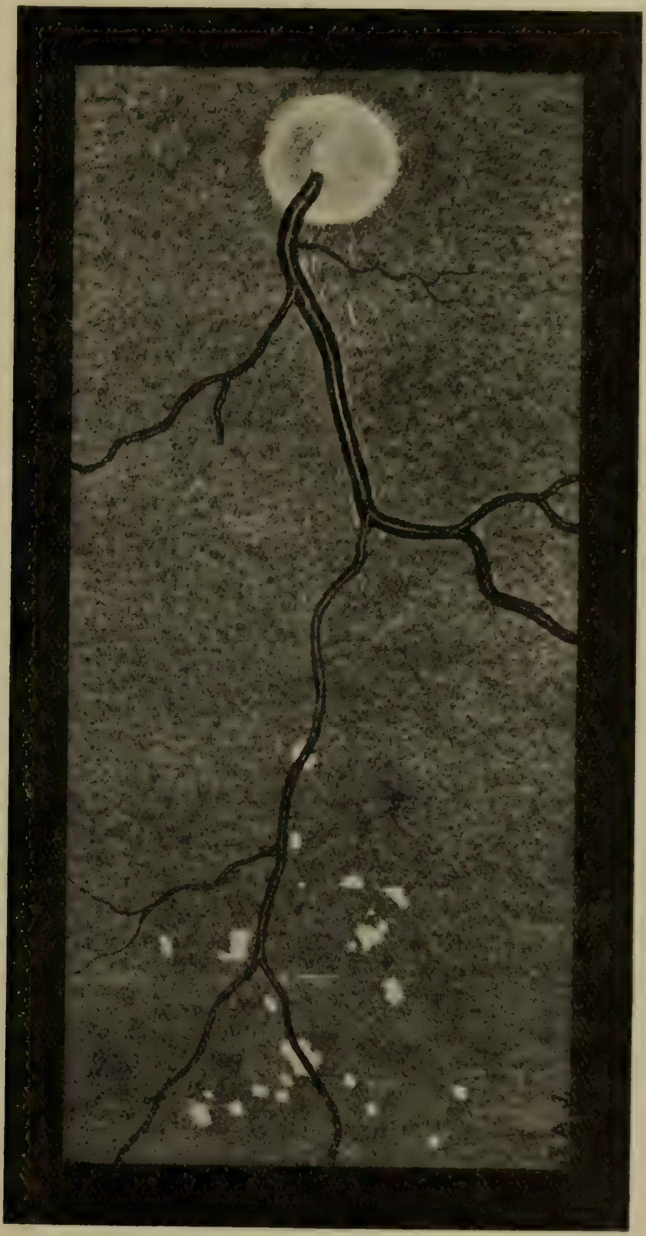
As regards the general treatment adopted—viz., mercurial inunctions and neosalvarsan, I do not think any particular benefit was derived from them, for, as already stated, the keratitis punctata was of the benign type, the deposits being small though somewhat plentiful, and as stated by Fisher, and as exemplified by his case and by the six cases included in the Committee's Report, this type of case almost always does well. We may repeat the Committee's statement with regard to mercurial inunction that "they (and '606') had no decidedly bad effect upon sympathetic ophthalmitis."

The normal differential blood count is in accord with my previous experience.

DESCRIPTION OF THE DRAWING.

The changes in the fundus consist of a number of spots or small areas distributed towards the periphery all round. The area here depicted was situated vertically below the disk, and the drawing represents as accurately as possible the position, shape, and colour of every spot that was visible over this small area on September 29, 1918: at this time the greater part of the periphery of the fundus was normal and quite free of spots.

When seen a few days ago at hospital the details of the area depicted were readily identified; the spots had much increased in number. Thus, previous single spots were now represented by a group of five or six separate spots, and fresh spots had appeared in many places; in addition, groups of them were now present towards the periphery all round. They were quite irregular in shape and did not show any particular relation to the vessels. They were I believe in the superficial layers of the choroid. Vitreous opacities were present. There was no pigmentary disturbance around them, and



very little, if any, evidence of œdema, and indeed, but for the evidence of increase and alteration whilst under observation, one would have had some doubt from their general appearance, as to whether they were not of old standing, and therefore not causally related to the disease.

Mr. FRANK JULER: The final result of this case is excellent. I endorse the statement Mr. Foster Moore has made about the course of the case, as I had the opportunity of seeing it in France in its earlier stage. When I last saw the patient in France, in October, the vitreous opacity was very marked indeed, so that one could not make out, very definitely, the exact outline of the spots of choroiditis. I saw the patient again, at hospital, a few weeks ago, and the vitreous opacity had then almost entirely cleared and the K.P. had, I think, almost entirely disappeared. When I saw this case in its earlier stage, there were many fluctuations in its progress.

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Section of Ophthalmology.

President — W. T. HOLMES SPICER.

Angeioid Streaks in the Retina.

By ELMORE BREWERTON, F.R.C.S.

PATIENT, a female, aged 36. Her sight has been failing for three months, chiefly in the right eye. She has worn glasses for short sight for nine years. Vision: Right, $\bar{c}$ $-3\cdot5$ D. sph. $= \frac{6}{24}$; left, $\bar{c}$ $-3\cdot5$ sph. $= \frac{6}{9}$ partly. In both eyes brown bands are seen radiating from the disks and becoming narrower as they reach the periphery. The horizontal band on the nasal side of the right disk bifurcates a short distance from the disk. There are degenerative changes at the right macula. In the left eye the bands are very broad, with irregular edges. They meet in a brown area surrounding the disk.

I brought this case before the Section because of the extensive character of the changes. In the literature it is difficult to find any references to the subject. Ward Holden considered the streaks to be remains of hæmorrhage diffused in a linear direction through the layers of the retina. I cannot, however, imagine how blood can follow along lines in the retina, except in the nerve-fibre layer, and these streaks are not in that layer, but posterior to it. Therefore I cannot accept that statement. Lister believes them to be vestiges of new vessels, along the course of which are arranged exudates which have undergone secondary pigmentation. I do not think the streaks in my case are new vessels, because in the left eye the streaks meet in a lake or pool round the disk, and you can scarcely have a vessel which extends all the way round the disk. In Zentmayer's case a horizontal extravasation of blood was present while he saw the angeioid streaks. Pagenstecker

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[1] At a meeting of the Section, held March 28, 1919.

reports two cases; he watched the streaks of blood develop later into these typical streaks.

I think they must be remains of hæmorrhages between the retina and the choroid; that is the only place in which blood could form and remain as streaks. Their colour is that of hæmatin. Usually they seem to have been associated with some form of chronic inflammation.

The PRESIDENT: So far as I know no satisfactory explanation has been given of this appearance. I have shown one case here in which the condition seen was the same in a brother and sister: it was the same in all four eyes. The pigmentation in my case was much greater than in this, and the edges much sharper. In my two cases I think it would have been impossible to say that the streaks were not blood-vessels: they seemed to have the colour of veins, although the colour was due to pigment. There must have been a blood-vessel at the centre. With regard to Mr. Brewerton's view that the condition is due to vascular disease, my other case was one in which a man suffered greatly from hæmatemesis and had become very anæmic, and it is likely the condition arose as part of his anæmic condition. I have very little doubt as to the situation of these streaks. They are not on the surface of the retina, because the retinal vessels run so clearly over them. I think they must be between retina and choroid.

Congenital Pigmentation of the Cornea.

By Miss ROSA FORD, M.D.

MRS. C., aged 42. A line of brown dots about the level of Descemet's membrane, in both eyes, near the centre of the cornea, sloping down and inwards. The patient has never sought advice for her eyes before, and now complains only of slight discharge and of presbyopia. Vision $=\frac{5}{9}$ both eyes. Eyes otherwise normal except for congenital punctate opacities of both lenses.

The PRESIDENT: I remember seeing two cases like this, and those only at long intervals between them, so the condition must be very rare. In each of them the line was vertical as in the present patient. The pigment was distinctly granular, and resolvable into separate dots, quite deep in the cornea. One patient was a woman, aged 30, who had never had any affection of the eyes; the other was a man, aged 26, who had had sore eyes in childhood, and whose brother had had interstitial keratitis but in whom there were none of the stigmata of congenital syphilis. The presence of staining, apart from ulceration, is not uncommonly met with in nebulæ the result of ulceration, which has not always been attended by the presence of blood-vessels, and is quite superficial.

Pulsating Tumour of the Orbit, of Uncertain Nature.

By Harold Grimsdale, F.R.C.S.

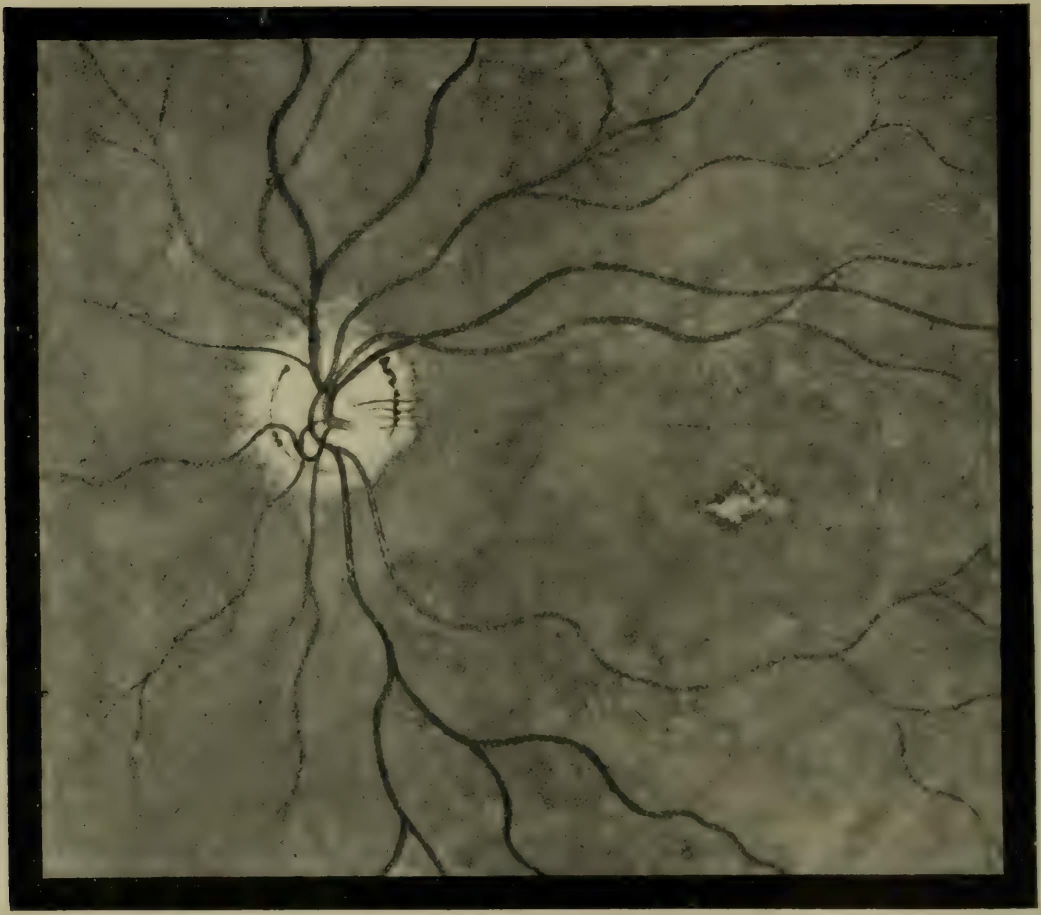
Patient, a boy, aged 13. I have only seen him once before at the hospital. He has a tumour just above the orbital margin, spreading up under the skin for half an inch. It seems to be connected with the supra-orbital vessels. It ceases pulsation when one compresses the carotid on that side. The boy is otherwise healthy and has had no accident. The sensation felt when the tumour is palpated suggests the presence of a number of dilated arterial, or at least pulsating trunks, in fact of a cirsoid aneurysm.

Postscript.—The provisional diagnosis of cirsoid aneurysm was proved to be correct at the time of operation. My colleague, Mr. Fedden, kindly took the boy under his care. He made an incision just below the orbital margin and, after some trouble, secured the enlarged supra-orbital artery. Through other small incisions above the swelling, he secured three other branches connected with it from the upper side, one of these was certainly connected with the anterior temporal: the pulsation ceased for two days and returned; Mr. Fedden then tied the anterior temporal, and cut down and removed the main sac, which was thin walled and about $\frac{3}{4}$ in. in diameter. Some twenty small arterial trunks were secured during the dissection. Since this second operation there has been no return of pulsation.

Symmetrical Disease of Macula (with drawing of Left Eye).

By Rayner Batten, M.D.

Patient, a girl, aged 17. She has probably had acute papillitis at the onset. Three years ago she lost the sight altogether in the course of a fortnight. Three months later she had recovered partial perception of light. She now has opaque white disks and symmetrical disease of the macula. There was no acute illness at the time. I have seen a fair number of these cases of symmetrical disease of maculæ, and one point of interest seems to be the frequency with which the onset occurs at about puberty in both sexes. This girl had had no menstrual period for a year, and she attributes the onset of her trouble to that. Both disks are pale and atrophic and opaque. Both maculæ are occupied by a small white arc surrounded with a darker pigment ring. The changes are most marked in the left eye. Vision: Right, $\frac{2}{60}$. Field—small central inside, 10°; Left, hand-movements only.



Symmetrical disease of the macula.

DISCUSSION.

The PRESIDENT: Does Mr. Batten think the macular disease is secondary or separate from the optic neuritis?

Mr. BATTEN: I think it is part of the same process.

Case of Intra-ocular Growth.

By J. F. CARRUTHERS, M.B.

THE case has been rather a puzzle. He was sent over from the Rhine Front, with no definite history, though I believe he has been seen by Colonel Lister. He came without any medical papers. When he arrived his left eye was greatly proptosed. A skiagram showed more shadow in the left orbit than in the right. The Wassermann reaction was negative. The man says it commenced three months before I saw him, that is, four months ago, and the changes have come about fairly quickly. There was no pain nor trouble of any sort until the onset of diplopia, the method of onset of which I do not know. The growth has been hard all through. When I first saw him the most noticeable feature was optic neuritis, of about 2 D. when first seen, and it increased to 4 D. I asked Mr. Lawford to see him in consultation, and he suggested that before any radical operation was thought of he should be given mercury and iodides. Three days after I had commenced the administration of full doses of mercury and iodide a remarkable chemosis occurred, which was entirely lymphatic: there was no congestion nor vascular engorgement. The cornea seemed to be at the bottom of a pit. That condition lasted forty-eight hours; there seemed to be no indication to interfere and I did not do so. The subsidence set in and the growth became flat, and with that there was a reduction in the optic neuritis. I hoped, therefore, it would prove to be gumma, and therefore curable. After subsidence had persisted for a week, however, it remained *in statu quo*, except for the continued reduction of the optic neuritis, which is now only ½ to ¾ D. Within the last week a little keratitis punctata has appeared: it was not there previously. Captain Wallace pointed out that when one puts a little pressure on the top of the eyeball the superior vein straightens and the whole disk blanches. I do not know whether that possesses any significance. I have had the nose and the antrum examined, and the report is that the sinuses are normal.

Case of (?) Pituitary Tumour.

By A. W. Ormond, F.R.C.S.

Patient, a female, aged 26. Married five years. Two children, aged 2 and 4.

History.—August 12, 1918: Came to Guy's Hospital. Complained of inability to see with right eye and also aching; vision in upper half of field only. About a month ago when patient was having a meal her eyes started twitching and then her present condition set in. Scintillating scotoma (?). Rheumatic fever three times. In hospital fourteen months.

Right Eye ... ... $\frac{6}{60}$ $\bar{c}$ $- 1$ cyl. $= \frac{6}{36}$.
Left Eye ... ... $\frac{6}{24}$ $\bar{c}$ $- 1{\cdot}25$ sph. $= \frac{6}{6}$.

Both optic disks red and neuritic. Ozæna. Bad smell in nose. Suspicious streak of pus in nasopharynx. Exploration of sinuses advised; this was carried out. Right posterior nares (? pus).

September 30, 1918: Exploration of right antrum, *nil.* Left antrum, *nil.* Exploration of right sphenoid, *nil.* Left sphenoid not entered. *Staphylococcus aureus.* Anterior of each middle turbinal removed.

March 10, 1919: Pain at root of nose and over inner canthus. Headaches. Discharge from both nostrils, blood-stained. Attack of misty vision of both eyes. Pupils react to light. Optic neuritis with ensheathing of veins of both eyes.

March 13, 1919: Smell in nose is less offensive, but the discharge has still a bad smell. The operation has made no difference. There is still discharge in throat and in nose. Headaches persistent and bad, recurring almost daily. Complains of revolving phenomenon before sight goes; still gets attacks of loss of sight. Is putting on flesh. Right pupil rather larger than left; both active, but right more sluggish.

March 14, 1919. Vision: Right eye $= < \frac{6}{60}$. Sees above and to outer side, but not to nasal side at all. Optic neuritis with ensheathing of vessels.

March 21, 1919. Vision: Left eye $= \frac{6}{36}$, with $-1{\cdot}5 = \frac{6}{9}$. Field full to fingers, but things are not seen as clearly on nasal side as on temporal. Optic disk is red and slightly neuritic. Pituitary tumour (?).

X-ray taken. Sella turcica very much enlarged. Fields for colour taken. Right eye: Macula is involved, blind in lower and nasal part of field. Left eye: Macula is not involved. General contraction most marked on nasal side. Fields for red and blue similarly contracted: red smaller than blue.

This case is interesting from the point of view of diagnosis; on the whole, I think, it is probably a case of pituitary tumour. When I first saw the patient, in August last, I looked upon it as a case in which the optic disks were involved secondarily to some nasal trouble, and I handed her over to my colleague, who examined her nose, and explored both antra and the sphenoid, and removed the anterior end of each turbinal bone, but without finding anything very definite. She did not improve very much, and when I saw her again I reconsidered my idea and had a skiagram taken of the skull. The sella turcica is very much enlarged, so much so that the body of the sphenoid seems to be eaten away to a great extent. The fields, also, are atypical, as the hemianopia seems to be more on the nasal than on temporal side, and rather below. The presence of optic neuritis on both sides, the fact that she is putting on weight, and the skiagram all seem to suggest pituitary tumour, probably malignant.

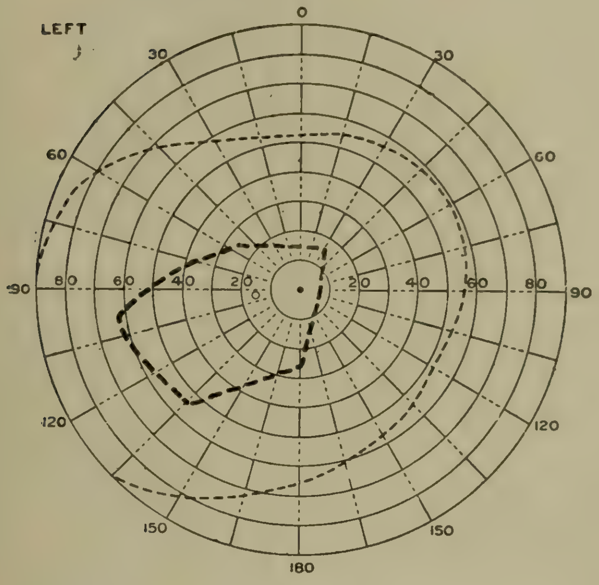


CHART 1.

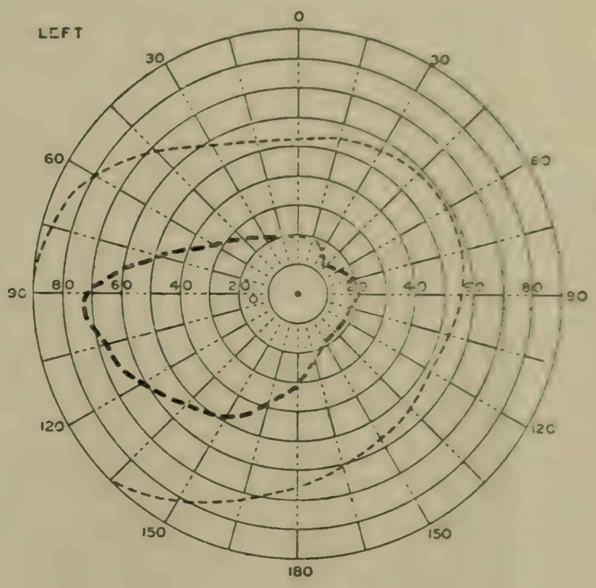


CHART 2.

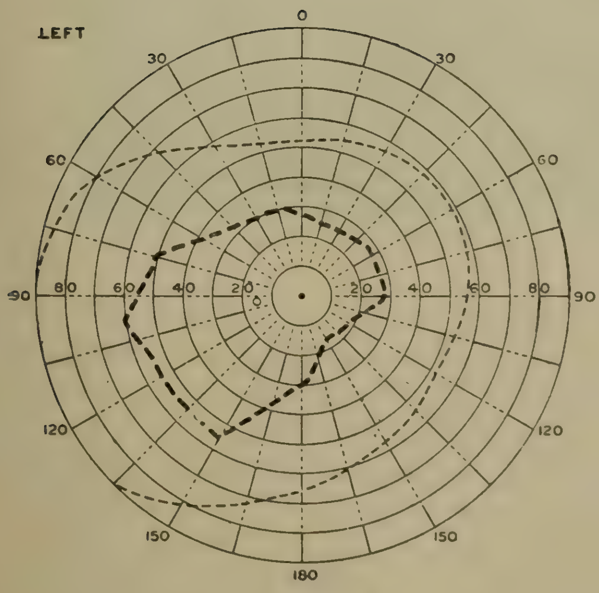


CHART 3.

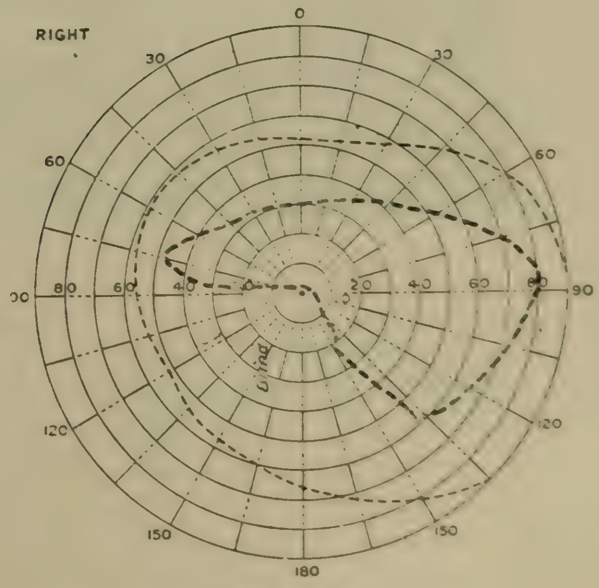
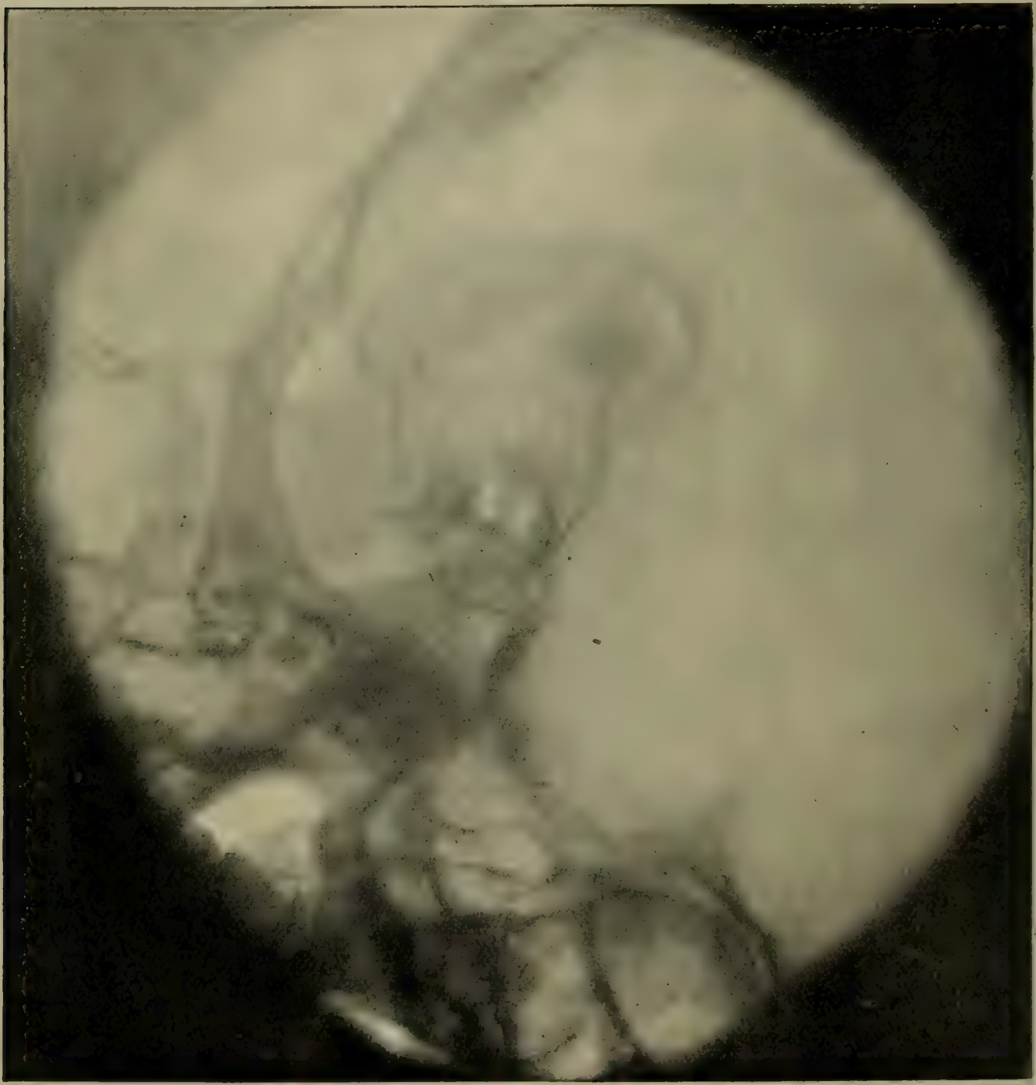


CHART 4.

Would any member advise puncture of the tumour in the hope that it may prove to be cystic, and so give the patient the chance of amelioration? If it were sarcomatous this would not do good, but we should get some further clue as to the nature of the tumour.



(?) Pituitary tumour.

Mr. J. H. FISHER: I saw this case hurriedly, but I should agree with Mr. Ormond that this is probably a malignant growth with very extensive destruction of the sella turcica. The complete absence of the typical signs of pituitary tumour—i.e., a tumour starting in the pituitary body, and the absence of the secondary phenomena which pituitary tumours manifest in other parts of the body, seem strongly to favour the view that it is malignant. The fields are not those which would be expected as the accompaniment of a large pituitary tumour. There is but little chance of dealing with this case by surgery, although puncture might be tried without doing much harm.

Pituitary Tumour (Hypopituitarism).

By L. V. CARGILL, F.R.C.S.

PATIENT, a male, aged 22, soldier. Duration of disease not stated.

History of Case.—Family history unimportant. Is eldest of six. No eye trouble in family. Previous history: Always had good health. History of present attack: Was working at a telephone switchboard last Christmas when he discovered, in consequence of getting tobacco smoke into the right eye, that he could only see half the board with the left eye.

Complete temporal hemianopsia left eye, the nasal field being encroached upon some 15° from vertical below. Wernicke's sign present. Right field contracted; to temporal side especially. Both optic disks pale—simple atrophy. Looks younger than his age, having the general appearance of a youth of 16; very little hair on face; weight, 5 st. 2 lb. Sexual organs and pubic hair normal.

Radiograph shows enlargement of sella turcica in antero-posterior diameter; depth about average. Anterior clinoid processes undermined; posterior clinoid processes look partly effaced.

Cranial nerves (apart from optic) normal. Speech normal. Motor power, co-ordination and sensation good. Arm and abdominal reflexes good. Knee-jerks exaggerated. Left ankle clonus; none right. Plantar reflex not obtained. No sphincter trouble. Chest, *nil.*

Photograph, radiographs, and field of vision charts exhibited.

DISCUSSION.

Mr. J. H. FISHER: This case is much more like one of primary disorder of the pituitary body than the case Mr. Ormond showed. Although in Mr. Cargill's case the general phenomena are not particularly marked, there are disturbances of the secondary sex characteristics, and the erosion of the sella turcica is of a much more typical character. I think this is a disorder of the pituitary in which the onset occurred after adolescence was completed. I have a case under my observation which I have been seeing for many years, and the patient is now 35. In his case the disease started rather earlier, though the condition has remained in abeyance for eighteen to twenty years. He has infantilism coupled with secondary sex characters remaining undeveloped. We should try to distinguish between cases of tumour of the pituitary body itself, and those in which the tumour is in that region. I think Mr. Ormond's case is extra-pituitary, primarily because of the way in which it has involved the visual pathway: in this respect it rather suggests a growth infiltrating the ocular pathways after destroying the base of the skull.

Dr. JAMES TAYLOR: I agree with Mr. Fisher that this is a case of hypopituitarism which may, possibly, depend on destruction of the pituitary body by a cystic growth. And it is one of the cases in which, I think, before anything else is attempted, one would be inclined to feed the patient upon pituitary extract, in order to see whether the condition can be corrected or at least modified. If that should be successful, the case might be explored, in the hope that, if the condition were cystic, it might be relieved by operation.

Case of Malignant Disease of the Pituitary Body, with Comments.

By G. MAXTED, F.R.C.S.

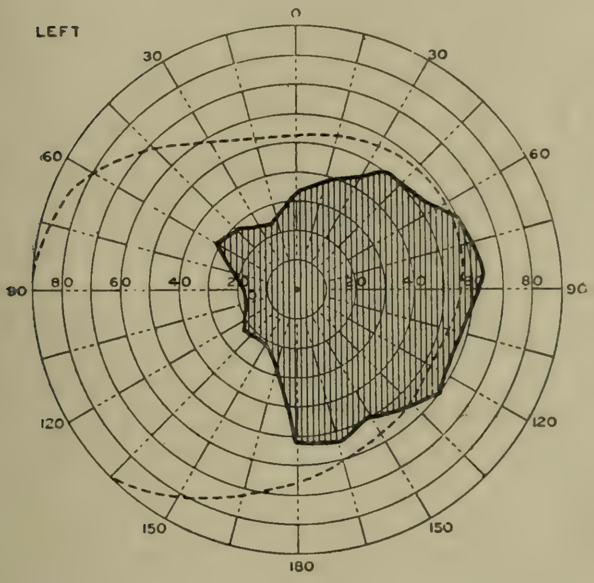
THE notes of this case are very imperfect; many observations that might have been made are lacking; nevertheless the case has given one an opportunity, too often unobtainable, of investigating some points about malignant disease of the pituitary body.

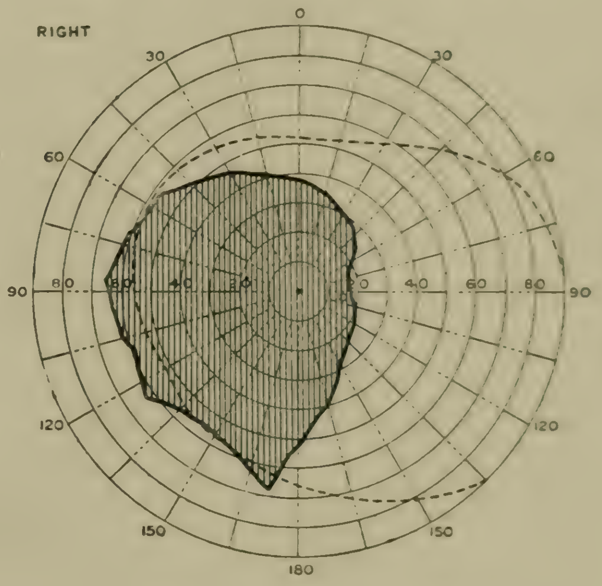
The patient, a well-nourished man aged 25, was admitted to hospital on convoy from France, on March 11, 1918, on account of an annoying diplopia which had persisted for about a month before admission. This diplopia was preceded for about eleven months by slight and occasional attacks of epistaxis which had never been severe and of which little or no notice had been taken. The diplopia was also preceded by intermittent headaches which up to the time of admission had never been very severe and had not incapacitated him.

The onset of the diplopia was said to have been sudden, and on examination the right eye was seen to be divergent and there was crossed diplopia; the movements in and down of the right eye were deficient; the palpebral fissure on the right side seemed to be slightly wider than on the left. The patient stated that at the beginning of the attack, in January, 1918, the divergence of the right eye was extreme, and that it was now much less than at the commencement. The right pupil is semi-dilated and fixed, and there is no concensual reaction. The throat was examined, and the epistaxis reported to be due mainly to a chronic pharyngitis. The Wassermann test of his blood on March 20, 1918, gave a negative result. It was noticed that the patient was looking anæmic and he was given an iron tonic.

On April 19, 1918, a note was made stating that his headaches were becoming more troublesome, and that pus was coming from the back of the nose or throat somewhere and on re-examination it was noticed that he had a markedly deflected septum, was a mouth-breather, and the chronic pharyngitis was persisting and was considered to be the source of the muco-pus in the throat.

The first week in May the vision was recorded as follows: Right eye $\frac{6}{24}$, with + 1·50 sph. = $\frac{6}{6}$; left eye = $\frac{6}{6}$. Both disks a little pale but no appreciable pathological change except the slight pallor. On May 23 operation for deflected septum was undertaken: after the operation it was noticed that there was a good deal of oozing of blood for some days, but no importance was attached to it at the time, and on June 11 the patient was sent to an auxiliary hospital for five weeks, during which time he was not seen, but complained of the now almost continuous bloodstained mucus from his throat, and produced as evidence, a handkerchief with many bloodstained patches upon it. On his return to hospital he still also complained of headaches, the diplopia persisted and he wore a shade over the right eye in consequence, and the right pupil remained dilated and fixed; still no decided pathological change in the disks was apparent. Further examination of the nasal sinuses showed no further evidence of sinus suppuration. The anæmia, if anything, seemed to have become more severe. On August 12 it was noticed that there was some weakness of the left external rectus muscles as well as the partial third nerve paralysis of the right eye, and a lumbar puncture was done, when it was noticed that the cerebro-spinal fluid escaped in a stream from the needle as though under pressure, although it was quite clean and revealed no





pathological changes on clinical and bacteriological examination; the Wassermann reaction of the fluid gave a negative result.

On September 2 there was still considerable discharge from the nasopharynx and the patient complained for the first time of dizziness; further examination of the nose revealed some hypertrophy of the posterior end of the left middle turbinal and it was decided to explore the sphenoidal sinus; on September 12 the patient was given an anæsthetic: the sphenoidal sinus on the right side of the mid-line was found to be full of a soft, very hæmorrhagic, mass resembling growth, with destruction of the posterior wall of the sinus; a small piece was removed, and sent for microscopical examination which revealed a sarcomatous growth, probably a tumour of the pituitary body. On recovering from the anæsthetic the patient noticed that he was almost blind and by the following morning the blindness was complete, with no perception of light of either eye; both pupils were dilated, and did not react to light, and both disks showed a decided pallor; the edges were not sharply defined, and the lamina cribrosa not visible, in fact they had the appearance rather of commencing secondary atrophy than of primary, but no swelling could be seen. The blindness was complete for five days, and then began slowly to disappear, and ten days after the operation, vision right eye $\frac{1}{60}$ and vision left eye $\frac{4}{60}$. Four days later, vision right eye $\frac{5}{60}$, vision left eye $\frac{6}{36}$, and by October 9 (four weeks after operation), right vision $\frac{6}{60}$, left vision $\frac{6}{24}$, with + 1·0 D. sph. $\frac{6}{12}$.

On September 23, stereoscopic X-ray view showed destruction of the sella turcica with the anterior and posterior clinoid processes and lack of definition of all that area of the base of the skull. The fields of vision, charted for the first time on September 22, after recovery from the period of blindness, showed a very striking bitemporal hemianopia, the nasal side of each field remaining nearly full. On recovery from the post-operative attack of blindness, the diplopia returned, but the pupils remained semidilated, the right one continued quite fixed, but the left one reacted again very partially to light; accommodation too, remained almost completely paralysed. The headaches were considerably relieved by the operation: the disks became slowly and progressively more pale and atrophic, but when last seen about a fortnight before the patient's death they were far from being completely atrophied such as is seen in the bluish white disks of tabetics. The hæmorrhagic discharge from the nose continued and the patient's anæmia became more severe, but not extreme.

On December 5 he was again anæsthetized, the nose explored in the sphenoidal region, and soft vascular growth removed; a fresh opening was made in the sphenoidal sinus and 100 mg. of radium inserted for three hours. On December 10 the temperature went up, he became delirious, collapsed rather suddenly and died.

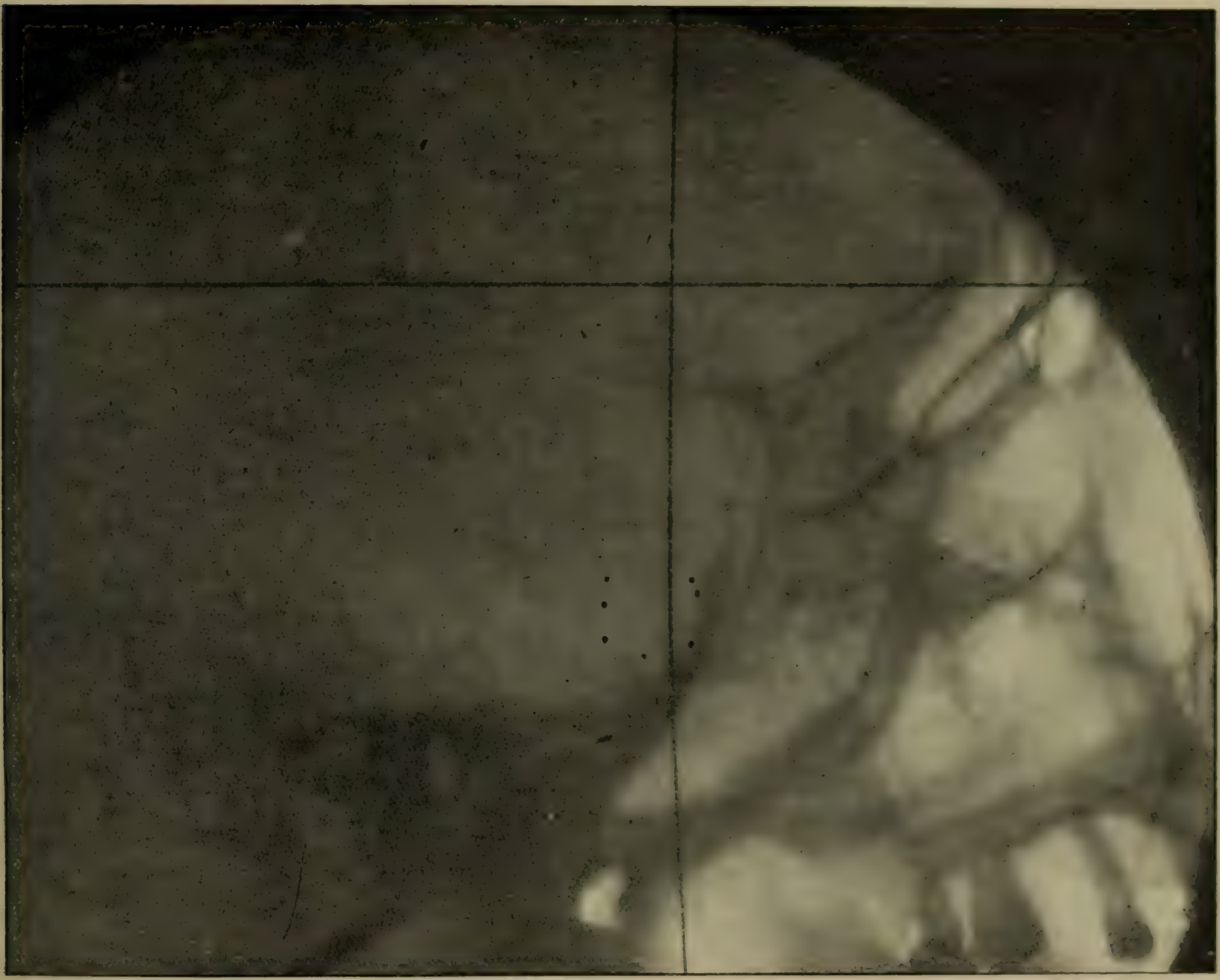


FIG. 1.

Malignant disease of the pituitary body.

At the post-mortem the condition was as follows: On removal of the cerebrum a large growth was exposed in the region of the sella turcica, with much erosion of the surrounding structures; the optic chiasm and the optic nerves were stretched over it and flattened out, resembling pieces of tape; one lobule of growth occupied the angle between the two nerves and was compressing the right nerve rather more than the left; the left sixth nerve was stretched over another lobule of the growth; these lobules were a deep purple in colour and nearly spherical in contour, looking not unlike a ripe grape in appearance and size. Both cavernous sinuses were distended to about three times their normal size with masses of the tumour and formed a bulging mass on either side in the middle fossa of the skull; the growth had not penetrated their dural sheath, which was stretched smoothly over them. The anterior clinoid processes had disappeared, and the lesser wings of the sphenoid were becoming eroded, more especially on the left side. On an attempt being made to dissect away the growth from the base of the skull, it was found to be impossible to remove it *en masse* as it was so soft as to become confluent directly it was incised; it was very hæmorrhagic throughout, and the colour almost of chocolate hue. When it was removed it was seen that the erosion of bone was very extensive, as was suggested in the last X-ray prints taken before death; all the clinoid processes, the sella turcica and its walls were completely destroyed, and no trace of the pituitary body as such was visible; there was a large hole in the bony wall of the sphenoidal sinus to the right of the mid-line through which the radium had been inserted; the front part of the dorsum sellæ was involved in the eroding process, its surface being rough and discoloured, and even the apex of the left petrous bone was becoming eroded. There was recent hæmorrhage into the growth, which was the probable explanation of his comparatively sudden collapse and death.

Pathological Report.—The section of the growth removed at the operation shows a carcinomatous tumour of the pituitary body undergoing cystic degeneration, a condition commonly seen in tumours of this region; there is also much hæmorrhage into it. Sections of the tumour removed post-mortem showed a similar condition.

COMMENTS.

No possible causal factor in the case was discoverable, there was no history of injury, no hereditary tendency, no previous infectious disease, all of which have been quoted as possible predisposing causes. Many of this patient's symptoms are worth while remarking on in greater detail; the one most troublesome, apart from the diplopia, was the headache, which was severe and persistent, mainly over the vertex, and was presumably due at first to distension of the glandular sheath, and later to the rise in intracranial pressure, although there was not at any time any appearance of choked disks to bear out this suggestion; but the lumbar puncture with the cerebro-spinal fluid obviously under pressure was in favour of the rise of intracranial pressure being the cause of the headaches.

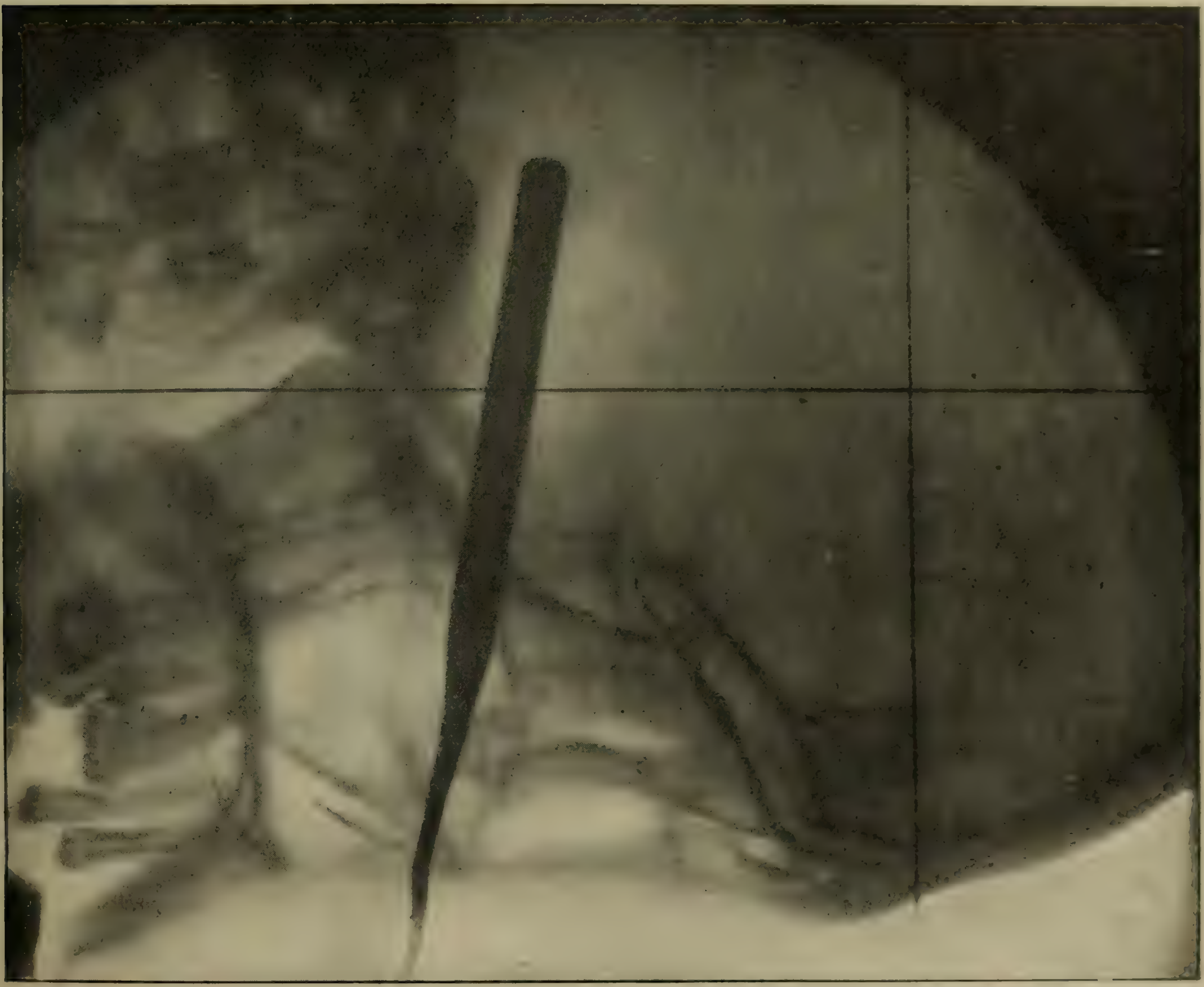


FIG. 2.

Malignant disease of the pituitary body.

As regards visual disturbances: although at the post-mortem both optic nerves were so obviously depressed and flattened out by the tumour, the main visual disturbance was the diplopia rather than the failure of vision, and up to the time of his death, the vision remained at least $\frac{5}{60}$ in the worse eye. The divergence of the right eye being at first extreme, and subsequently becoming less obvious, was one of the reasons for the delay in making a correct diagnosis, the improvement in the divergence of the eye at first leading one to think that the condition might be one of basic meningitis, possibly of syphilitic origin, although the negative Wassermann made this less likely. Both disks became atrophic, but at a comparatively late stage, and neither of them ever showed any appreciable swelling in spite of the direct evidence of increase in the intracranial pressure.

Apparently it is quite the exception for complete blindness to result in these cases, for in a series of nearly fifty cases mentioned by Cushing, only once did blindness ensue. The visual fields show a fairly symmetrical bitemporal hemianopia, the symmetry of the fields being somewhat unusually accurate, a condition that was present in only three of twenty-two cases mentioned in Cushing's book, and is certainly less common than generally supposed.

The total blindness, coming on almost immediately after the decompression operation, was unexpected and rather alarming. It was thought at the time that vision would not return, but fortunately in about four or five days it began slowly to return until it reached the same degree as before operation; the cause of the temporary blindness was presumably hæmorrhage or œdema in the growth resulting in a temporary increase of pressure on the optic nerves; during this period of blindness the disks did not alter in appearance and showed no signs of any swelling.

The epistaxis was another symptom which unfortunately was misinterpreted for a considerable time, it being explained as being due to chronic pharyngitis possibly associated with sinus disease, a condition which was another possible source of the origin of diplopia. The true origin of the trouble was not discovered until the anterior wall of the sphenoidal sinus was opened, when masses of the tumour were revealed. It was noticed quite early that the patient was a mouth-breather and as he had a very deflected nasal septum it was thought advisable to remove it.

The trans-sphenoidal decompression had an excellent effect upon the headaches, which were very greatly diminished by the operation, and never again became severe. The effect of the inserting of radium into the tumour was rather disastrous, producing as it did softening and necrosis of the substance of the growth, which was associated with hæmorrhage into it, causing more or less sudden rise of intracranial pressure, rapidly followed by the death of the patient.

So far as can be ascertained there were none of the signs associated with interference with the secretions of the pituitary gland, but the drowsiness of the patient, who often used to sit doing nothing for long intervals, the tendency to an abnormally slow pulse, which was usually between 50 and 60 per minute, associated with a subnormal temperature, which was persistently about 97° F. when taken, were perhaps suggestive of a commencing state of hypopituitarism.

I wish to thank Captain G. W. Goodhart, who did the pathological work in connexion with the patient, and Captain W. G. Howarth, who performed the operations, for valuable assistance in publishing this account. I also wish to thank Major Ormond for placing the patient at my disposal.

DISCUSSION.

Mr. J. H. FISHER: My remark on this case is, that there was early diplopia, which was probably due to involvement of the third nerve in the cavernous sinus on the right side. I think diplopia is liable to be an early sign in these cases of malignant pituitary tumours. In one of my own cases that was one of the earliest signs, being preceded only by sexual impotence. That patient was a planter from the West Indies, and he had difficulty in seeing properly the various rows of plants, and in crossing the Atlantic to come to England for advice, he saw two-funnel steamers as vessels with four funnels. I wonder whether there have been sex phenomena in this case. Perhaps it illustrates the need for early use of the perimeter; it is possible the case might have been diagnosed earlier if the perimeter had been used.

Mr. G. MAXTED (in reply): I could not ascertain whether this patient's sexual function was affected.

Migraine.

By J. HERBERT FISHER, F.R.C.S.

THE primary classical symptoms of migraine are the scintillating scotoma, followed by localized and usually unilateral headache, which culminates in nausea or in actual vomiting; but there are others which are generally recognized, and as I have myself been the victim of migraine headache all my life, I can speak of at least two of them which are in my case constant. These two, apart from the extreme feeling of general depression, are:—

(1) A marked reduction in the pulse-rate.

(2) A striking increase in renal activity, which results in a copious secretion of pale urine.

In many migrainous subjects one or more of the type symptoms may be absent, and personally I have never experienced any disturbance of vision. My headache is invariably localized in the same left temporo-frontal position, nausea is usual, and vomiting not infrequent. I have been subject to the trouble certainly from 12 years of age. Whereas in my earlier life a night's sleep invariably ended the attack, the tendency in the last few years has been for the attacks to be a little less severe, but certainly of longer duration, so that at my present age of 51, I am not free until nearly forty-eight hours after the onset During my attack there is a certain amount of variation in the severity of the headache, and it is always very noticeable that when there is, for a short period, a mitigation in the severity of the headache, there is associated with it a slight increase in the pulse-rate; at my worst, the latter has been to my knowledge as slow as forty-six beats per minute. All digestive and absorptive processes in the alimentary canal appear to be in abeyance in a severe attack, presumably in consequence of the lethargic circulation.

There is a familial tendency often in the disease; both sexes are liable; there is a periodicity about the attacks; my present interval is about fourteen days. In the female subject the attacks often coincide with the menstrual periods; they often cease during pregnancy, and usually terminate for good and all with the climacteric; in the male subject the liability to migraine commonly also ceases when the patient reaches about 50 years of age.

The migraine spectrum, on an average, lasts from twenty minutes to half an hour; the visual aura of epilepsy, on the other hand, for a few seconds only; the former is a lowly organized subjective visual phenomenon; the latter is a more highly perfected visual sensation, and presumably originates in the cortex of the visual centres, whence the disturbance rapidly spreads to the motor and sensory cortex. The migraine aura must have a different explanation. The migraine spectrum is always symmetrical: it may be represented by a scotoma expanding from the central point of vision: it may first appear in the temporal periphery of the fields, or affect the homonymous halves of the two fields of vision. If flashing light sensations appear homonymously, they will be followed by hemianopic loss of vision in the half fields implicated, and the headache will develop in the opposite side of the head.

The lowly organized visual spectra could, I conceive, be produced by irritation of the visual nerve fibres at the base of the brain; implication of them at the chiasma would explain the expanding central scotoma, or the bi-temporal scotoma. When one or other optic tract is involved, we should get the homonymous spectrum; presumably the crude impulse initiated in the basal fibres would be to some extent elaborated by the grey matter of the visual cortex.

That the hemicrania develops on the side opposite to the homonymous scintillating scotoma agrees well with the idea that the latter is initiated in the optic tract.

There appears to be only one region where a lesion, slightly varying in incidence, can reach the various parts of the basal fibres, so as to explain all varieties of the migraine scotoma; this region is the interpeduncular region, and I am going to be bold enough to suggest, what I believe has never been put forward before among all the suggestions hitherto advanced on the pathology of migraine, that the pituitary body is the exciting agent. It is well worth considering. Very slight swelling of the hypophysis would enable it to exert sufficient pressure to irritate the visual fibres in any of the required positions. The cessation of migraine during gestation, when the pituitary body undergoes profound modification, and at the climacteric, and in males at the period when sex powers begin to wane, are very suggestive; are there any other points in favour of the new suggestion?

The headache, slow pulse and vomiting, are the general signs accompanying raised intracranial pressure; swelling of such an intracranial structure as the hypophysis, would have this effect, especially if its over-activity caused an increased production of fluids by the intraventricular choroid plexuses. It is, however, also known that reduction in the rate of heart beat follows the injection of pituitary extracts in animals. The increased renal activity is very well explained on the pituitary body theory. This gland secretes a hormone which is proved to exercise a direct effect upon the renal epithelium, so that, in spite of the lowered blood-pressure, a great increase in the amount of urine secreted results when it is experimentally injected into animals. The hormones pass primarily into the stalk of the pituitary body to join the intraventricular fluids. If the hypophysis be over active, and accordingly for the time tumefied and enlarged, an increased supply of the hormones necessary to stimulate the renal activity would presumably result. Such hormones might also stimulate the activity of the intra-ventricular choroid plexuses, and raise the intra-ventricular pressure.

The familial tendency of migraine, the periodicity of the attacks, their abeyance during pregnancy, their cessation at about 50 years of age in both sexes, would all be in agreement with the pituitary body theory. If the central, bitemporal or homonymous scotoma became permanently established, there would, I imagine, be little difference of opinion as to the site of the lesion; surely the indication is not less, but rather more, convincing when the manifestations are periodic and in any given case invariable, although transitory. Differences in effects on the same fibres leave room for argument as to nature of lesions, but not as to their situation. I believe a periodic temporary swelling accompanying functional over-activity of the pituitary body explains migraine better than any other hypothesis. I am treating some migraine subjects by glandular therapy. I have had their sella turcicas examined by X-rays, with negative results, but I should expect no bone changes in these cases.

I suppose we shall not yet attempt to treat migraine by decompression at the sella turcica, but I believe it would be efficacious.

DISCUSSION.

Dr. Gordon Holmes: I am very interested in Mr. Fisher's communication, though not fully convinced. In order to relieve him from the invidious position of putting forward any theory as to the causation of migraine in the twentieth century, I think I can find a reference to an earlier communication setting forth similar views. His arguments seem to lack force, and I do not believe the facts he has put forward will convince many that migraine is due to the mechanism he suggests. If it were, one would expect to find migrainous phenomena fairly frequently, in cases of pituitary tumour, or in any enlargement of the pituitary body associated with various physiological conditions. But, as far as I know, these phenomena have not been observed: I have never observed them in association with pituitary enlargement, whether malignant or physiological. Again, I know of no evidence that irritation of the optic tract can produce such positive subjective sensations as the typical teichopsic phenomena. I have seen cases in which the optic chiasma has been compressed by tumours, but these never present the symptoms which characterize migraine. And if the explanation put forward by Mr. Fisher of headache holds, can we expect to have such localized reference of the pain in these cases? In Mr. Fisher's own case it is always in the left temporal or the left temporo-frontal region. I have suffered from migraine for years, and I have experienced all the phenomena which Mr. Fisher has, except that in nine cases out of ten I have marked visual changes. I do not see how you can explain headache of this nature if it is due to increase of the cerebro-spinal fluid filling up the ventricles, since the cerebro-spinal fluid escapes from the ventricles and is absorbed by the circulation very quickly. In my case the pulse-rate rises as soon as the headache begins: therefore I do not think a slowed pulse is a characteristic of these attacks.

Dr. JAMES TAYLOR: Has Mr. Fisher tested his blood-pressure during the attacks? That would be a more definite guide in reference to pituitary influence than is the pulse-rate. I have no personal experience of migraine, but in the cases I have seen the pulse-rate has been more rapid as a rule. I should hesitate to accept the phenomena of migraine as evidence of anything more than cortical irritation. I was interested in Mr. Fisher's remark that women subject to migraine are often free from it during pregnancy, because in that respect it is analogous to epilepsy. It is notorious that during pregnancy epileptic patients are often free from fits, but I do not think you can associate this fact with any influence on the part of the pituitary body. I believe migraine to be a cortical affection, but I am prepared to accept further evidence of Mr. Fisher's suggestion.

Mr. LESLIE PATON: I am extremely interested in this subject personally, as I began to suffer from migraine when I was 19, and did so until I was 35. During the last ten years I have occasionally had scotomal symptoms without very severe headache. There are a considerable number of types of migraine, apart from that which Mr. Fisher has described, which would need explanation on a similar hypothesis. He speaks of the visual aura of migraine not being so organized or elaborate as that of epilepsy. The first prodroma I had which alarmed me was a typical central scotoma with whirling balls of light, and in my first attack blindness was almost complete. In many of my subsequent attacks, my visual aura was much more organized: a dream state with a very definite visual aura, the picture being practically the same each time. I have had a visual aura when I was lecturing, and I have asked my listeners whether they noticed any hesitancy or abnormality in my delivery, and the reply has been in the negative. As I always got very pale down one side of my face, my wife could tell when an attack was imminent. At one time a friend subject to migraine was staying with us, and during attacks I watched his disks, from the onset of the scotoma until his state got too violent for the observation to be continued. At the onset I noticed no change in the blood-vessels at all, but when the headache was commencing, there was marked engorgement of vessels in both eyes. As the prodromal stage passes off in my case I have a feeling of unusual well-being, with some sweating down the side of the face which was pale: then in five or ten minutes the headache commences. There is one type of migraine which commences with paræsthesia on the side of the tongue, and sometimes in the fingers of one hand. One patient of mine always has paramnesia, a memory of having lived in the same conditions before. Another friend of mine has a paranosmia as his prodroma. The migraine attack, in another case, starts with acute pain in the wrist. All these different forms of prodromata must be taken into account in any theory which would seek to explain migraine, and it is difficult to see how pituitary swelling can account for them all.

Mr. M. S. MAYOU: I know of two cases in women whose migraine is worse during pregnancy. There are several other symptoms of migraine which Mr. Fisher has scarcely touched upon. One is the digestive disturbance which usually comes on after an attack. In my case these symptoms are very constant, and last for forty-eight hours. Many people exhibit a large quantity of oxalates in the urine, severe attacks of migraine occurring before an attack of renal calculi. This happens to myself, and as a "cure" I was enjoined to drink large quantities of Contrexéville water before breakfast, with the result that my migraine has almost ceased. I have recommended the same course to other people similarly affected, and in many instances they have much benefited thereby.

Mr. J. H. PARSONS: Is the scotoma associated with migraine the ordinary central scotoma? I have had migraine, and I remember discussing this question with Mr. Nettleship. My experience is that the scotoma is not central, it is the centre of the field which escapes: that is, if you alter your point of fixation, you can always, momentarily, see what you look at, though I admit it quickly becomes clouded. It is difficult to explain the aphasia of people who are subject to migraine, on any but a cortical hypothesis. It would be difficult of explanation on a pituitary hypothesis.

Mr. J. B. STORY: I know one case, of a lady who gets attacks of teichopsia and frequently suffers from partial aphasia: she has difficulty in saying what she means when attacks come on. Personally I have had scotoma scintillans often enough, and it has been excentric: the macula lutea was never involved and headaches were never unilateral. I have had an attack while golfing, and I played no worse than usual.

The PRESIDENT: I also have suffered from this migraine. One phenomenon from which I suffered for a time very definitely consisted in severe attacks of giddiness at the onset of the migraine. I do not know now whether I had nystagmus or not.

Mr. J. H. FISHER (in reply): I am not surprised to hear that I have failed to convince any one. I did not expect to do so. I am not sure that I have yet convinced myself. At all events, I have made a suggestion which has been received with interest. In answer to Mr. Hugh Thompson, the pituitary body is capable of producing homonymous hemianopia, and the migraine scotoma is not always homonymous: sometimes it is central, sometimes bitemporal, sometimes lateral, but in all cases it is symmetrical. In answer to Dr. Gordon Holmes, it is surely conceivable that a rapid tumefaction will give rise to violent headache, while it may produce over-secretion of intraventricular fluids as a further cause of increased intracranial pressure; if the swelling developed notably to one side I take it the headache would be localized, and that would correspond with the headache developing on the side opposite to the homonymous scotoma. Dr. Gordon Holmes maintains that cases of pituitary tumour pressure do not produce symptoms of scotoma such as we meet with in migraine. This does not appear to be convincing as against the idea that a rapidly-swelling pituitary body, as a transitory phenomenon, might produce a variety of irritation of the visual pathways different from that which a more slowly-growing tumour would cause by expansion and consequent pressure on the same visual pathways. More importance should be attached to the fact that the phenomena are those of involvement of the visual pathway than to the exact nature of the visual phenomena which result from the implication of those pathways. I should have thought that an organic stimulus of the visual pathways in the interpeduncular region would initiate changes which the cells of the cortex might elaborate to a higher degree. With regard to Mr. Paton's remark on the retinal circulation, I should imagine that that indicated some impediment to venous return, suggesting a raised intracranial pressure of a transitory kind. The other phenomena, such as aphasia, would be sequelæ of disordered cerebral circulation. Laterally the pituitary body is practically in contact with the carotid artery on either side as it rises out of the cavernous sinus, and the slightest swelling of the gland would exert pressure on the artery and produce grave disturbance of the cerebral circulation. The question is, what is it that primarily initiates these disturbances, which are nearly always introduced by certain visual phenomena, that are periodic, that frequently develop with the sexual phenomena, and that cease at the age of decline in sexual life? Taking the matter as a whole, I do not think there is a better explanation than that afforded by the pituitary body hypothesis. I was not aware that it had ever been brought forward before and if there is a reference I should be glad to be told of it. It is possible that in course of time many conditions at present grouped together as migraine will prove separable into different categories when knowledge increases.

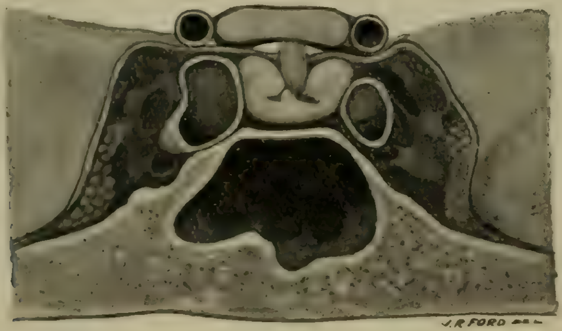
Section of Ophthalmology.

President—Mr. W. T. HOLMES SPICER.

Drawing of a Transverse Section through the Optic Chiasma and Sella Turcica to show the Relations of the Pituitary Body.[1]

By J. HERBERT FISHER, F.R.C.S.

THE drawing is one of an anatomical specimen, prepared in the shape of a vertical coronal section through the optic chiasma, the pituitary body, and the cavernous sinus on either side, and the sphenoidal air cell.



Vertical coronal section through the optic chiasma, the pituitary body on either side, the cavernous sinus and the sphenoidal air cell. (Natural size.)

The stalk of the pituitary body passes somewhat forward in its downward course, and is cut in the section; above it is seen the optic chiasma, at the outer end of which on either side is the ophthalmic artery. The internal carotid artery having come forward in the floor of the cavernous sinus, and made its bend with the convexity forwards, is cut on either side as it ascends out of the sinus, to pass on the mesial aspect of the anterior clinoid process.

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[1] At a meeting of the Section, held June 4, 1919.

The section shows that the sella turcica has no lateral boundary, and reveals, what is perhaps insufficiently recognized, that the carotid artery, where it begins to ascend, is lying in immediate contact with the lateral surface of the pituitary body. It is obvious that a very small amount of swelling of the pituitary body would be capable of producing an immediate pressure upon the internal carotid artery, and would in this way be capable of exercising a profound effect upon the cerebral circulation. That such interference might be likely to produce some of the distant symptoms associated with migraine seems to me quite reasonable. At the same time, the diversion of the blood-stream into the external carotid artery would afford a satisfactory explanation of the tense, distended, superficial temporal artery on the same side as the headache, with which sufferers from migraine are so constantly familiar.

Pigmented Connective Tissue immediately in Front of and Covering the Optic Disk.

By L. V. Cargill, F.R.C.S., and W. J. Lindsay, M.D.

Patient, a male, aged 22 ; soldier.

History of Case.—He was sent home from France as a case of "avulsion of optic nerve." He was struck in the face by some small fragments of shrapnel on October 26 last ; but was off duty only three days. On enlistment it was noted on the medical history sheet—" Right vision, $\frac{6}{6}$. Left vision, $\frac{6}{0}$." He states, " left eye was never any good." No history of any illness but measles. No disease of nose or accessory sinuses. X-ray report : " No evidence of orbital fracture or other abnormality." Wassermann reaction negative. No history of eye injury previous to enlistment.

Right eye normal. Left optic disk hidden by a pigmented mass of connective tissue in front, which projects forwards 3 D. to 5 D. from the level of the fundus. The most anterior extremity is delicate and filmy with slight floating movements like the remains of hyaloid sheath, but there is a spot of pigment near the extremity. From the mass, white glistening bands radiate out into the retina like the bands of retinitis proliferans, and from beneath some of them, as they gradually taper off, retinal vessels appear, the bands seeming to blend with the vessel coats. Some of the bands anastomose with one another forming an open meshwork to some extent. There are one or two outlying spots of pigmentation to the temporal side. The left eye is normal in all other respects; but it is blind.

This is an interesting case of a soldier from the Fourth London General Hospital. His right eye, as already stated, is normal. In his left eye he has a very unusual appearance in front of the optic disk, of which Mr. Wallace has made a drawing. After receipt of his injury the condition was labelled "avulsion of the optic nerve," but I think all here will agree that the appearance is not that of avulsion of the optic nerve.

With regard to causation there are three possibilities: (1) That it is some anomaly in development; (2) that it is due to some trauma; (3) that it is inflammatory. Weighing the probabilities one is inclined to the view that it may be due to fœtal inflammation or some massive hæmorrhage in front of the disk. Evidently it is not due to injury at the time the small shell fragments struck his face; and he has no recollection of other injury to the face or head, or of a blow upon the eyes. His mother reports that his birth was particularly easy, so that the question of hæmorrhage from instrumental delivery is excluded.

Obstruction of Central Retinal Artery with Patent Branches, following Electric Flash.

By F. A. JULER, F.R.C.S.

S. L., AGED 32, attended St. Mary's Hospital on May 27, 1919, for blindness of right eye since May 19.

History: On night of 19th inst. while passing up through a manhole in semi-darkness, there was a bright flash of an arcing between two forks of copper strips some 6 ft. from his head. The light was intense, from a 480 voltage and continued for about half a minute until he could reach the switch to turn off the current. His sight was unaffected at first, but two hours later a mistiness in the right eye started, and reached a maximum in a quarter of an hour, when the eye was quite blind. It remained so for two hours, and then in the course of the next two hours almost completely recovered. Half an hour later he went to sleep, and awoke two hours afterwards to find the eye again blind. Since then it has remained in the same condition.

Past history: Previously he had good sight, and was a gunlayer in the Royal Navy for nine years, using his right eye for sighting. In January, 1918, he had attacks of pain in the chest lasting a few minutes. Later he got rather short of breath, and was in various hospitals until April, 1918, when he was discharged from the Navy. He has had no further trouble until now. He has not had rheumatic fever, and denies venereal disease. He never had any obscuration of vision before.

Eyes: Vision—left, $\frac{5}{4}$, fundus normal; vision—right, $\frac{5}{60}$ barely. Right fundus shows the white opacity of the retina which is associated with recent obstruction of the central retinal artery. The macula is evident as the usual liver-coloured spot, and a strip of retina from the disk outwards nearly to the macula has escaped owing to the presence of a small vessel probably cilio-retinal in nature. The retinal vessels look normal and of full calibre, perhaps the central reflex streak on the arteries is not quite so marked as in the left eye. Digital pressure on the globe does not appear to elicit pulsation in the arteries more easily in one eye than in the other. The field of vision corresponds with the area of intact retina.

Heart: Dr. F. S. Langmead reports as follows: Impulse heaving. Cardiac dullness 1 in. outside nipple line. Apex beat, sixth space, systolic murmur conducted to spine, diastolic also. Base: Loud rasping systolic, loudest in second inner space on right side, but heard all over base, and towards apex. No aortic second sound. Diastolic murmur heard only on the left of lower half sternum up to apex. The basal systolic is accompanied by a forcible thrill, well heard in the back on both sides, and conducted up into the carotids. Pulse full, regular, and somewhat collapsing. He adds that the lesion of the heart is probably congenital, and may be of the nature of a foramen between the auricles.

This is a case of embolism of the central artery of the retina, which shows some unusual features. The first of these is, that there is a part of the retina, to the outer side of the disk, which is not opaque, and looks healthy, and there is a small vessel, obviously of cilio-retinal origin, supplying this part of the retina. This is not uncommon in cases of obstruction of the central artery. The second interesting point is the nature of the obstruction. The man has an extensive heart lesion, upon which Dr. Langmead kindly reported, and Dr. Langmead thought that possibly it was of congenital origin, owing to the extensive nature of the murmurs of the heart. In addition, the retinal arteries at this date—a fortnight after the onset of the disease—are quite patent, and their calibre is full in comparison with that of the retinal arteries of the other eye.

As already stated, the patient was engaged in his electrical work, when there was a sudden flash due to an electrical arcing, at about 6 ft. from him. Two hours later the eye was gradually going blind, but an hour later still, his sight came back almost completely. After that, he went to sleep, and when he awoke two hours later, the eye was again blind. This is the sort of history which one gets with intermittent attacks of obscuration of vision in many cases where there is endarteritis causing thrombosis of the central artery, but I do not think it is the usual thing in a case of pure embolism. However, having regard to the heart lesion, one must assume that there was an embolus, and it is possible to imagine that the clot which lay in the central artery shrank, and allowed the vessels to become patent again: and during sleep, when the blood-pressure was lowered, blockage of the artery again became complete. The other explanation is that an anastomosis between the ciliary and retinal vessels at the optic nerve head has dilated up, and allowed the latter vessels to fill with blood.

The question of compensation is another feature of interest in the case. The man was at work, and this electrical flash occurred close to him, and shortly after it he became blind: so I think there must be some causal relation between the flash and the blindness.

Postscript.—Later note, June 10, 1919: The retinal arteries show definite pulsation now, and their calibre is smaller.

Melanoma of the Choroid.

By R. Foster Moore, F.R.C.S.

This man shows a melanoma of the choroid in the right eye, a drawing of which was made by A. W. Head five and half years ago, and was published in vol. xix, part iii, of the *Royal London Ophthalmic Hospital Reports*[1]: it is now exhibited. If the ophthalmoscopic appearances be compared with the drawing, it will be found that the growth is quite unchanged in every way. It shows the characteristic homogeneous

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[1] *Roy. Lond. Ophth. Hosp. Rep.*, 1914, xix, Plate VII, facing p. 414.

"blue ointment" colour of these tumours, with a defined edge, which is not quite hard and sharp, but is somewhat feathered. There is no disturbance of pigment over the growth nor around its edge. These features supply a characteristic ophthalmoscopic picture, which differentiates them from a very early melanotic sarcoma. They give rise to no symptoms, and are discovered on routine examination.

I also show you by the epidiascope sections from a melanoma which were published along with the coloured plate referred to above. They were obtained from a patient who died of myasthenia gravis; the tumour was discovered a week before he died. They show how heavily pigmented are these growths, and how sharply limited they are in the choroid; the chorio-capillaris and sclerotic are not infiltrated. This specimen also shows a collection of heavily pigmented cells in the ciliary muscle, a feature which, according to de Schweinitz and Shumway is very common in negroes.

There was one other case which I published in the first number of the *British Journal of Ophthalmology*.[1] The patient died of a cerebral tumour, and the appearances, both ophthalmoscopic and microscopic, were precisely similar to those of the above cases.

These growths are not exceedingly rare; I have seen a very large one, which was six or eight times the area of the disk. It is of course highly important to recognize them, lest an eye should be enucleated for what after all is no more than a pigmented mole, and there are few of us, I suspect, who have not somewhere on our bodies a growth of such a nature.

An Unusual Case of Ptosis with Bilateral Ophthalmoplegia Externa.

By M. L. Hine, M.D., F.R.C.S.

R. B., aged 18, was brought to the Royal Westminster Ophthalmic Hospital on May 28 last, to see whether anything could be done to improve her vision by raising the lids.

Family history: Father alive and well; mother died twelve months ago in an asylum of "pulmonary tuberculosis," after being an inmate for seven years; three brothers alive and well; two sisters alive and well.

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[1] *Brit. Journ. Ophthal.*, 1917, i, p. 26.

History of present illness: Four years ago both of the patient's upper lids began to droop, and at the same time she was unable to move her eyeballs. She was taken to the Royal London Ophthalmic Hospital in September, 1915, to see whether her lids could be raised, but no operation was advised. The fundus was not examined, and her father states that her sight has always been good. No change has taken place in the condition during the past four years. She has a violent temper, and "father sometimes fears she will end, like her mother, in an asylum."

Present state: Right vision, $\frac{6}{18}$; left vision, $\frac{6}{12}$. Under H. and C.: Right vision, $\bar{c}\ \frac{+3\text{ sph.}}{+1\text{ cyl. }90} = \frac{6}{18}$; left vision, $\bar{c}$ +4 sph. $= \frac{6}{12}$. With post-mydriatic correction (0·5 sph. less than above) she reads J2 at 6 in. with either eye, showing there is no loss of accommodation. There is almost complete ptosis, and also external ophthalmoplegia, with a slight range of movement in each eye, as indicated below, rather greater in the left eye than in the right. Range of movement as shown on perimeter:—

	Right eye	Left eye
Internal	5°	10°
External	8°	2°
Upward	3°	5°
Downward	2°	4° (down and in)

No diplopia is complained of when both lids are raised. Pupils equal and active to light and accommodation. Both fundi show fine, scattered lesions of old retino-choroiditis. No vitreous opacities. No other stigmata of hereditary specific disease. Wassermann reaction negative.

Dr. Gordon Holmes reports that her reflexes generally are diminished, but otherwise considers she must be one of the rare cases of localized nuclear paralyses.

Mr. McMullen, in vol. xxxii of the *Transactions of the Ophthalmological Society*, reported a similar case in a man aged 34, in whom the ptosis and ophthalmoplegia developed at the age of 8, and, like his case, the present case would appear to belong to the group of chronic nuclear atrophies described by Wilbrand and Sanger, and in the larger text-books on neurology.

"Orbital ridge" spectacles, kindly suggested by Mr. Rayner Batten, with the appropriate correcting lenses, have been ordered for the treatment of this patient.

The Visual Perception of Solid Form.

By E. M. Eaton, M.D.

(ABSTRACT.)

[This paper was printed *in extenso* in the *British Journal of Ophthalmology*, August and September, 1919, pp. 349, 399.]

It is almost universally accepted that binocular vision is the essential factor in stereoscopic vision. I am convinced that this view is erroneous, and in the following paper I hope to satisfy you that it has no justifiable foundation. This will involve a restatement of the principles of binocular fusion on a basis of less intimate organization of the two eyes than that commonly accepted. There are two principal theories of binocular vision—namely, the theory of corresponding points and that of projection. Both involve serious inconsistencies. The theory of projection, with appropriate expansion, can be so formulated as to be entirely consistent with the facts however. The mechanism of binocular vision as I conceive it may be summarized as follows :—

(1) The vision of each eye remains physiologically independent except as regards fixation : apart from this the unification of the two images has reference to the object perceived, not to the means of perception.

(2) The physiological axes of vision are interpreted as occupying their actual positions, the lines passing through the point of fixation and the nodal points of each eye.

(3) The perceptive axis of vision lies between the fixation point and the middle of the interocular space. Its use involves a psychic modification of all visual angles similar to that which enables us to interpret foreshortened images in accordance with their true values.

(4) The perception of position in three dimensions is a function of the sense of directional projection of the two eyes. The perception of relative position in three dimensions is a function of the sense of relative directional projection of the two eyes.

(5) Double images result from a certain degree of perception of the subjective element in the sense of sight, with consequent alteration of the foregoing relationships.

This theory denies the existence of physiologically corresponding retinal points. As there is no specific type of sensation involved in binocular vision I conclude that there is no reason on subjective grounds to differentiate between the stereoscopic perception of binocular vision and that of uniocular vision. It can be shown also that there is no valid reason on objective grounds, for whenever the amount of information apparently made available by binocular vision becomes appreciably greater than that available to one eye, that is in the sense of our being in a position to see around an object, we get either duplication or suppression of a part of one retinal image.

The sense of perspective is dependent on the same fundamental sense factors as the binocular function, and it is analogous to this function in its mental relationships. It is more stable and less liable to illusion in average circumstances, for larger differences of angles are available as the basis of judgments by its means.

There are many other factors in stereoscopic vision but none is universally essential. Much of the effect obtainable from stereoscopic photographs is due to stereoscopic lustre. In relation to such pictures this factor derives an augmented importance from the incidental circumstance that photographs do not reproduce natural lustre convincingly. The perception of lustre is dependent on apparent incongruity of light intensities and thus results from similar causes whether observed with one eye or with two.

The requirements for the perception of solid form are that the appearances should contain in sufficient degree any of the characteristics of solidity such as perspective, shadow effects, or differing binocular images, and that observation of the characteristics presented should be habitual. In the case of projection representations it is of course necessary that they should not contain inconsistencies of a degree sufficient to cause effective antagonism.

The loss of one of the accustomed characteristics on closing one eye places the observer at a disadvantage, but this is in great part due to his habit of seeing with two eyes. The loss of any factor to which we are accustomed will reduce the vividness of the mental image, but this does not imply alteration in the perception of form.

Sections of Ophthalmology and Laryngology.

COMBINED MEETING.

Mr. W. T. Holmes Spicer, President of the Section of Ophthalmology, in the Chair.

DISCUSSION ON INJURIES AND INFLAMMATORY DISEASES AFFECTING THE ORBIT AND ACCESSORY SINUSES.[1]

The President.

It gives me very great pleasure to preside over this joint meeting of the Ophthalmological and Laryngological Sections. Some years ago, the Ophthalmological Section held a joint meeting with the Section of Otology, and that had very important results, because, among other things, it succeeded in bringing to our notice an absolutely unique case.

It is to be hoped that we have added very greatly to our knowledge by the extraordinary events of the past four years, and I am hoping that this meeting will be of equal value and interest to us. The idea of this meeting arose, I believe, from the Ophthalmological Section, and our reason for calling this joint meeting was that we wish to know a great deal more about the dangers which beset our precious optic nerve throughout its course from the brain to the eye. Those regions are within our province.

I perfectly well remember the time when ophthalmic surgeons treated empyemata of the ethmoid and frontal sinuses because they were obliged to treat them: there was very little expert knowledge of those cavities in existence. You can readily believe that when I say that the departments of laryngology were presided over, in some of the largest hospitals in London, by physicians, and the outlook and object of the work of these sections of medicine was purely medical. We have changed all that now: I think perhaps there is hardly any of us who would care, or dare, to treat such conditions as empyemata of these cavities, because we feel that we have not the knowledge which is requisite for efficiently dealing with them. But we desire to have all the knowlege we can obtain about them, so that we may know when to call in someone who is expert on these questions.

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[1] At a meeting of the Joint Sections, held April 2, 1919.

Mr. L. V. CARGILL, F.R.C.S.

I propose to briefly survey some of the ground for discussion. The Section of Laryngology, the members of which have done much to further our clinical knowledge of sinusitis, held a discussion in 1911 at Bristol on "The Relationship of Diseases of the Nose and Accessory Sinuses to Affections of the Eye and Orbit," which was ably opened by Sir StClair Thomson and Mr. Richardson Cross. The Section of Ophthalmology was not then constituted, but since its formation, in 1912, a joint meeting has been desirable to co-operate in discussing the further clinical evidence of close relationship between inflammatory diseases of the accessory sinuses and disorders of the orbits.

Fairly frequent though cases may be of sinusitis with ophthalmic complications, we each of us see comparatively few, and we therefore look for such an interchange of views at this combined meeting as will further amplify and codify our present knowledge. Largely surrounded as the orbits are by the accessory sinuses, the frontal sinus sometimes reaching well across the roof, and ethmoidal cells sometimes reinforcing the antrum beneath the floor as far as the infra-orbital canal, it is remarkable that the baneful influence of these oftentimes septic cavities was not appreciated earlier.

As students we learnt the parchment-like thinness of the roof, floor and inner wall of the orbits, but it is to the development of rhinology during the present century, and to more precise anatomical researches, that we are largely indebted for the building up of our present knowledge. Ónodi[1] pointed out that the walls of the sphenoidal and posterior ethmoidal sinuses may have the thinness of tissue paper, and that the sinus of one side may extend over into close contact with the opposite optic nerve and so cause contralateral complications; whilst Francis and Gibson[2] in a study of 100 normal orbits found the sphenoidal sinus itself, or a diverticulum from it, separated from the orbit in some cases by a wall only $\frac{1}{4}$ mm. thick. Considering that the orbits with their highly specialized and vulnerable contents have territories so liable to infective disorders in such close and embracing contact it is surprising that instances of ophthalmic complications of proved sinus origin are not more frequent.

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[1] "Ueber die Kontralateralen Sehstorungen nasalen Ursprungs," *Zeitschr. f. Augenheilkunde*, xxxi, p. 324.

[2] "The Anatomical Relation between the Sphenoidal Sinus and the Orbit," *Ophthalmoscope*, ix, p. 172.

By the timely interference of the rhinologist, patients are no doubt often saved from orbital complications; but, in other cases, the patient having had no nasal symptoms, or having disregarded them, comes first to the ophthalmic surgeon for relief from the consequence of orbital implication. Aspirants to ophthalmology will be well advised to obtain some practical knowledge of rhinology, for it will enable them to deal more intelligently with these cases.

The ophthalmic complications of sinusitis may present themselves as functional disturbances, toxic effects, or orbital inflammations, the result of direct extension through the orbital walls or foramina. The ocular complications, usually of unilateral character, include general peripheral or temporal contraction of the visual field, central scotoma, enlargement of the blind spot, retrobulbar neuritis, papillœdema and papillitis. Also uveitis and episcleritis must be mentioned, and cases have been reported of subretinal effusion, retinal hæmorrhage and detachment. Their incidence and frequency provide fertile ground for discussion, but I must not dwell upon them, except to add the acknowledged fact that sphenoidal and posterior ethmoidal sinusitis is, as one would expect from anatomical relationships, specially liable to affect the optic nerve.

We now know that nasal sinusitis—anterior ethmoidal, frontal or maxillary—is the preponderating cause of orbital inflammation and abscess. We have learnt to recognize that (with rare exceptions, and excluding localized marginal periostitis, tubercular or syphilitic) there are two groups of cases: a smaller group, comprising the retrobulbar inflammations due to trauma, metastasis or septicæmia; and a larger group of subperiosteal inflammations caused by extension from a septic nasal sinus, usually by necrosis and perforation of the orbital wall.

We have also learnt that orbital inflammations due to acute sinusitis, either ethmoidal or maxillary, may occur and are not rarities in early childhood. Influenza and acute specific fevers seem to be the usual primary cause of the ethmoidal cases and alveolar sepsis of the antral cases. Hosford has recorded the case of a child six weeks old attacked with orbital cellulitis resulting from antral sepsis due to alveolar suppuration, death taking place a week later in spite of free incision, with septic thrombosis and basal meningitis. These acute cases in young children often respond quickly to fomentations, general treatment and good nursing, and this may be explained by the smallness of the sinuses and the freer natural drainage.

Looking up the record of in-patients admitted for orbital inflammations at the Royal Eye Hospital, I find that with few exceptions they were of nasal origin, and that they constituted roughly 0·5 per cent. of the total admissions, and varied in age from 11 months to 68 years, the males being to the females as three to two, and the left orbit being affected rather more frequently than the right. This may not represent the full number coming to the out-patient department, for some cases were probably transferred to general hospitals for the collaboration of a rhinologist, and I would ask if the staff of an ophthalmic hospital should not include a rhinologist.

The ethmoidal sinuses were the most frequent source of trouble, then the frontal and lastly the maxillary antrum. In the presence of orbital inflammation of possible sinus origin we should seek expert rhinological opinion and remember that endonasal treatment in some cases has of itself proved sufficient. The rhinologist's findings may, however, be negative, the sinusitis being latent, and deferred or more elaborate examination, or even an exploratory nasal operation, may be necessary in order to definitely exclude sinusitis. In that case if orbital symptoms are urgent, or if expectant treatment (hot fomentations, antiseptic inhalations, purgatives, &c.) is not giving definite improvement incision should be made without delay for here as much as anywhere "a little neglect may breed great mischief."

We now recognize in dealing with these subperiosteal orbital suppurations that instead of the old-fashioned small openings directed into the orbital tissues according to fancied indications there should be a wide incision down to the bone at the orbital margin, and from it the periosteum should be separated backwards so that the orbital contents are avoided and a clear view of the orbital wall obtained. The ophthalmic surgeon should be prepared to complete the operation by following up the disease as far as is necessary to secure good drainage. The majority of cases being ethmoidal or frontal incision will be most frequently called for around the orbital margin at the inner and upper angle, thence for ethmoidal cases working backwards below the pulley of the superior oblique; in the fewer antral cases incision will be called for along the outer half of the lower orbital margin.

Turning to injuries affecting the orbits and accessory sinuses, the war has provided an immense number in many of which these cavities have suffered in common. Stress of work and shortness of time have prevented much note-taking. I am much indebted to Captain Whittington and Dr. Lindsay for notes of cases, to Dr. Knox for radiographs and to Captain Jenkins for the permission to allude to cases under his care. The proportion of head injuries has from the nature of the fighting been far greater than I experienced in the South African War and the proportion of wounds caused by shell fire greater than those caused by bullets, and this proportion increased as the war continued. The amount of damage done by shell fire to face, orbits, and sinuses was sometimes very severe, but it was oftentimes extraordinary how rapidly an extensively contused and lacerated wound improved.

In purely orbital injuries there were cases of shell fragments penetrating with little or no further damage. In other cases macula damage would result, or a choroido-retinal rupture would be caused by the missile grazing the eyeball, or the optic nerve would be injured; whilst in others the eyeball would be ruptured and more or less destroyed, and the surrounding tissues severely contused and lacerated. The prompt removal of the eyeball or its remains gave good drainage, and every case of purely orbital wound has in my experience recovered. Where there was much sepsis and cellulitis, fomentations, irrigation and free drainage, with the use of peroxide or iodine were rapidly effectual. As favourable factors we must give credit to the routine use of antitetanic serum, the previously healthy and vigorous condition of the patient, his age, and the employment of the "frill" operation in place of ordinary enucleation. Foreign bodies easily accessible, or giving trouble, were removed and a modified Krönlein operation was done to save the eye and remove a deeply situated missile. Assistance was obtained from accurate localization with stereoscopic radiographs, the telephone probe and electro-magnet. Showing how easily even large foreign bodies may be overlooked in the absence of radiography, a case was prepared for plastic operation on a socket when the discovery of a minute sinus led to the discovery of the flattened remains of a ricochet Turkish bullet embedded in the fractured orbital roof. No attempt was made to remove deep foreign bodies causing no trouble as we know that they frequently become encapsuled and may remain innocuous indefinitely. The removal of a small foreign body deep in the orbit is by no means easy, whilst there is risk of doing damage where a useful eye is present.

The frequent combination of injury to orbits and accessory sinuses added more bone damage, a greater septic danger, and increased the risks of infection spreading intracranially to the venous sinuses, meninges, or brain itself. Yet out of a large number of such cases seen during the period of the war at the Fourth London General Hospital, the Maxillo-facial and some half dozen other war hospitals, I am pleased to say that I have obtained notes of only three deaths, and in each case the implication of a nasal sinus was probably a crucial factor. They curiously enough furnish instances respectively of septic thrombosis, meningitis, and cerebral abscess, and are all examples of death at a late stage. According to my notes the maxillary antrum was the sinus far most frequently injured, and then in order the ethmoid, frontal and sphenoid. It would be presumptuous of me to discuss sinus treatment, but it seemed broadly summed up in free drainage and irrigation, and removal of sequestra and foreign bodies. Captain Jenkins cleared out the mucous membrane from septic frontal sinuses, and drained the maxillary antrum usually into the nose. Foreign bodies were sometimes removed from the orbits along a nasal track, just as they were sometimes removed from the nasal fossa via an orbital track. Inaccessible dormant foreign bodies were allowed to remain, and I can show a radiograph of one in the sphenoidal region. No doubt in future pension work we shall have to be on the look out for retained foreign bodies becoming troublesome. Not until all sepsis had ceased were plastic operations undertaken; and to this end septic lachrymal sacs and fistulæ sometimes required excision or obliteration.

Thrust wounds of the orbit, which are notoriously serious in civil practice from penetration of the roof and injury to meninges or brain, were I suppose relatively infrequent in the war, and when they occurred were probably often immediately fatal. I have notes of one unusual case involving the maxillary antrum and orbit:—

J. M. was returning to his trench in the dark when a star shell caused him to hurriedly scramble over the parapet and he stumbled on to a fixed bayonet the point of which passed into his mouth, up between the alveolus of the upper jaw and cheek, and through the right antrum to the apex of the right orbit. When seen there was complete ptosis of the right eye, a fixed eyeball, a fixed dilated pupil and no perception of light. There were remains of conjunctival hæmorrhage in the right lower fornix, the retinal veins of the right eye seemed full, but there was no other fundus change. X-ray plate showed injury to the right superior maxilla but no foreign body. The right antrum was washed out but contained no pus.

Shell explosions driving fragments into the region of orbit and face were often accompanied by *concussion changes at the macula* and sometimes by choroidal ruptures:—

Lieutenant E. R. Shell explosion driving numerous fragments around left orbit, especially over upper margin and near outer canthus. Two fragments driven into neck. Left eye contused but not penetrated; blind for a time. Concussion changes at left macula. A year later, central scotoma with divergence. Peripheral field good.

Sympathetic Paralysis resulting from Foreign Body lodging at the Back of the Orbit.—G. Missile entered front of right ear, fractured neck of right condyle and lodged at back of right orbit in spheno-maxillary region. Optic nerve atrophy. Choroidal rupture, macula region and to temporal side. Right palpebral aperture narrowed; pupil contracted and enophthalmos. Wound healed perfectly. No attempt made to remove foreign body.

Cerebral Abscess from Injury to Frontal Sinus: Recovery.—H. Kicked by a horse over left brow. Comminuted fracture of left orbital ridge involving left frontal sinus. Left eye contused. Left vision, fingers only, just after accident. Lacerated lids sutured; loose bone removed. Frontal sinus drained. Five days later: Headache; temperature 101° F. Frontal sinus drainage reinvestigated. Twenty-four days afterwards: Cerebral symptoms. Abscess found in frontal lobe of brain; egg-cup full of pus removed. Good recovery. Left eye: Full vision; fundus normal.

Fatal cases following *injury to orbits and ethmoid;* one from meningitis six weeks after injury, the other probably from intracranial thrombosis ten weeks after injury:—

C. Entrance left side root of nose. Track backwards and to right, fracturing outer wall of right orbit. Right eye removed with metal in right orbit and fragments of bone. Foreign body had passed across ethmoid fracturing right os planum and floor of anterior fossa of skull; brain exposed at inner and upper angle of right orbit. In spite of every attempt to remove sepsis, meningitis supervened and caused death of patient about six weeks after the injury.

B. Entrance of bullet inner side of left orbit, passed across ethmoid and buried itself in outer wall of right orbit. Right eye removed with bullet. Left eye: Keratitis and general injection. Right orbital tissues very swollen and œdematous and brawny œdema around. Malar bone comminuted. Four days after wound: Incisions above and below and opened between bone and periosteum, pus evacuated and tubes inserted. Fomentations. Swelling slowly but steadily subsided. Between four and five weeks later—headache, vomiting and temperature rising; gradually developed meningeal symptoms. Lumbar puncture, fluid turbid. Frontal lobe explored through right orbit—no pus found. A good deal of clear fluid in anterior fossa drained off by catheter. As he had had chronic otorrhœa for some years, a radical right mastoid operation was done, washing through via the internal auditory meatus with malachite green : there was no improvement. Further lumbar punctures were carried out; turbid fluid and streptococci found. Antistreptococcal serum given on six occasions, and lumbar puncture on six occasions, washing through with malachite green. Frontal and temporo-sphenoidal lobes again exposed but no pus found. Probably intracranial sinus thrombosis. Died four weeks after onset of meningeal symptoms and nearly ten weeks after being wounded.

Example of Injury to Orbit, Frontal Sinus, Ethmoid and Antrum.—B. Shell wound causing compound fracture of frontal bone and opening both frontal sinuses. One fragment removed from right sinus and sinus drained. A second fragment passed downwards across left orbit, destroying left eye, and then across left antrum, and through palate into mouth. Damage also to nasal process of superior maxilla, lachrymal and ethmoid. Cavity of nose and left conjunctival sac communicate. Did well. Plastic operations subsequently.

Examples of Injury to Orbit, Frontal Sinus and Ethmoid. One case fatal from cerebral abscess :—

F. C. G. Entrance right side of nose ; exit through left eye. Remains of left eye removed. Left orbit foul and discharging freely. Ethmoid and left frontal sinus penetrated. Both lachrymal bones and right nasal bone fractured. Frontal sinus opened for free drainage, carious bone removed, scraped and packed. Good recovery.

B. Severe shell wound of face, horizontally from side to side, destroying both eyes and root of nose. Remnants of both eyes removed. Both frontal sinuses opened and ethmoid implicated. Frontal bone fractured. Brain matter exposed in mid line. Sequestra of frontal bone in mid line and of ethmoid removed. Free drainage ensured. Good recovery. Plastic operations later.

B. Entrance wound of bullet left side of face, no exit wound. At casualty clearing station : Right eye proptosed and pulsating, no thrill, pressure on carotid controlled ; outer canthus split and outer wall of orbit exposed. Eye muscles divided when eye fell out. Ophthalmic artery ligatured. A month after original injury, increasing headaches and drowsiness. X-ray report indicated bullet in roof of right orbit in relation to frontal sinus. Exploration made, sinus opened and found full of blood-clot ; no foreign body, but opening found passing behind frontal sinus. After more exact X-ray localization trephined over indicated location and came down directly on bullet, which was removed. Pus oozing from brain substance, and fragments of bone removed. Frontal abscess opened, about an ounce of pus evacuated, drainage tubes inserted. Condition much improved and apparently satisfactory for some days, then recurrence of headaches and drowsiness and variable pulse. Drainage from tubes ceased. Wound explored ; large collection of pus (3 oz.) found deep in brain substance, opening in skull enlarged, drainage tubes inserted. Patient better on recovery from anæsthetic but suddenly collapsed and died next day, nearly two months after receiving the wound. No post-mortem.

Examples of Injury to Orbit, Ethmoid and Antrum :—

A. Extensive wound of right cheek, involving right antrum missile passed to left, upwards and backwards, and found by X-rays in left orbito-ethmoidal region. Right eye normal. Left eye: Veins engorged; choroidal rupture below; eye proptosed. Left orbit implicated. Sequestra right superior maxilla; antral suppuration. Foreign body removed by nasal route through ethmoid cells. Partial paralysis left third nerve. Left vision, $\frac{6}{12}$.

B. Entrance in lower part of left orbit, track across to back of right orbit. Right eye proptosed. Much sub-conjunctival hæmorrhage. Foreign body, back of right orbit. Left eye destroyed and removed. Much damage to left inner canthus, floor left orbit, and lower lids. Ethmoid perforated by missile. Left antrum opened by damage to floor of orbit. Foreign body removed via track from back of right orbit, behind eye. Left antrum septic and required draining and washing out for some time. Recovery with right vision, $\frac{6}{18}$. Astigmatism, no lesion visible. Much deformity of left cheek requiring plastic operations.

Examples of Injury to Orbit and Antrum: One case of septic phlebitis, and one of severe hæmorrhage three weeks after injury :—

W. Extensive gunshot wound right side of face destroying right eye, extensively lacerating lids and fracturing floor and back of right orbit and involving right antrum. Large abscess extending downwards over and below jaw. Septic phlebitis. Internal jugular tied. Recovery.

B. Entry of missile near left outer canthus, track downwards and backwards and piece of shell localized by X-rays deep in cervical muscles at level of and outside third cervical vertebra. Left eye destroyed and removed. Missile passed through left maxillary antrum, and across nasopharynx, leaving ecchymosis of uvula and palate. Three weeks after the injury left orbit and left side of face became distended followed by alarming bleeding from both nostrils and into left antrum and out through wound at outer canthus; external carotid tied. Hæmorrhage ceased. Sixteen days later, gradual onset of hæmorrhage from nose and antrum, soon becoming again profuse. Sequestra found at upper and inner corner of antrum; hæmorrhage from branch of spheno-palatine artery probably; patient blanched. Antrum tightly packed for several days. No subsequent hæmorrhage. Plastic operation later.

M. Wound left side of face with destruction of left eye. Fractured roof of left orbit. Depressed pieces of bone removed; wound drained; socket did well and healed. Six weeks later small sinus below right eye communicating with antrum; removal of large foreign body from and drainage of antrum. Recovery good.

K. Large starfish-shaped shell wound of right cheek, disorganizing right eye and causing comminuted fracture of right superior maxilla and malar bone. Disorganized right eye removed. Much loose dead bone removed. Drained well. Parts drawn together. Plastic operation later.

S. Entry in left cheek near inner canthus, track slightly down across both antra and nasal cavities and out through outer part of right cheek. Left eye destroyed and enucleated. Right eye: Vitreous hæmorrhage, macular lesion, and choroido-retinal concussion changes below. Damage to floor of left orbit with sinking in of cheek and partial destruction of left lower lid. Both superior maxillæ and right malar fractured, right superior maxilla comminuted. Septum nasi dislocated to right into contact with outer wall right fossa. Right antrum septic; numerous polypi and several small sequestra; latter removed and antrum drained and washed out. Later attempt made to replace septum. After about six weeks' treatment antral sepsis cured. Subsequent plastic operations. Right vision, $\frac{4}{60}$.

M. Projectile passed from above down and out, severely damaging inner portion of left upper lid near inner canthus, and imbedding itself in floor of left orbit, fracturing roof of left antrum. Left eye destroyed and removed with large piece of metal. Left antrum discharging from sinus below outer canthus and communication between orbit and antrum. Did not progress until antrum was drained, then cleared up within a fortnight. Plastic operations later.

C. Entry from above, track downwards across front of left orbit, wound of left infra-orbital margin and much destruction of lower lid, and exit near left second molar. Left eye removed. Floor of left orbit damaged, and left antrum penetrated. Mandible fractured near left angle. Septic antrum required draining, and washing out had to be followed for ten weeks owing to continued discharge from nose.

Example of Injury to Orbit, Sphenoid and Antrum; Foreign Body Retained in Sphenoidal Region.—R. M. Gunshot wound of face. Foreign body touching base of skull and embedded in right pterygoid process and wing of sphenoid. Contusion of right eye; large hyphæmia; no preception of light; no fundus reflex. Orbital injury indirect. Right maxillary antrum penetrated. Fracture of posterior part of superior maxilla. Did well. Gap in cheek eventually closed by flap from forehead.

Example of Injury to Orbit and Sphenoid: Foreign Body Retained in Sphenoidal Region.—M. Right eye destroyed and removed. Laceration of upper lid. Injury to right supra-orbital margin. Foreign body passed through right orbit into region of sphenoidal sinus, too deep for removal unless urgent symptoms present. Is doing well and perfectly comfortable. Radiograph taken four months later shows some opacity of the sinuses on right side and of sphenoidal sinus, with foreign body present.

G. SECCOMBE HETT, F.R.C.S., Major R.A.M.C.

I am very grateful for this opportunity of joining in the combined efforts for the elucidation of some of the points in the treatment of injuries and inflammatory diseases affecting the orbit and accessory sinuses.

INJURIES.

Early Stage.—Although I was first interested in the treatment of facial injuries from seeing cases on the French Front in 1915, my experience of the last three years has been of cases on arrival in hospital in England, at intervals of three days to three months after being wounded. If an eye required removal, it had usually been done at a casualty clearing station or hospital near the Front. The patients with combined wounds of the orbit and sinuses usually arrived with suppuration of these cavities. The principle of free drainage, together with the retention of any loose skin flap or portions of conjunctival mucous membrane, became established. The drainage of accessory sinuses was carried out and the malar bones, maxillæ, frontal and nasal bones retained where possible, only such portions lying free being taken away. The principle was just the same in upper face wounds as in lower jaw injuries: free drainage and as little removal of bony or soft tissues as possible. Mucous membrane was stitched to skin and was not taken away. Fragments of bone or metal in the frontal, ethmoidal sinuses, or in the maxillary sinus, were got rid of, and free intranasal drainage established. Similarly intranasal sequestra and damaged portions of turbinal or septum were taken away. In the later stages, where free drainage had not been established, or even in some cases where this had been done, chronic suppuration of one or more sinuses resulted. The radical operation was then performed. I think that attention to the production of healthy nasal passages and accessory sinuses is most essential to the success of the subsequent facial repair.

Later Stages.—*Gunshot wounds involving the orbit and frontal sinuses* generally result in chronic suppuration of the latter. The anterior wall of the sinus is frequently carried away and an obliterative operation is necessary. *Wounds involving the ethmoidal cells* frequently require a curetting of the labyrinth, despite early treatment in the way of getting free intranasal drainage. *It is a good rule to do an intranasal drainage in the case of all perforating wounds of the antrum*; it may prevent chronic suppuration. A series of over 100 cases of gunshot wounds involving the antrum have been treated in my Ear, Nose and Throat Department, Queen's Hospital. If the cavity contains metal or bone fragments the ordinary Caldwell-Luc operation should be performed. In some of these cases, especially of bullet wounds, the projectile has done its own operation by carrying away the inner wall of the antrum and in these cases the free drainage produced by the wound prevents chronic suppuration of the cavity. I have seen two cases of gunshot wound of the sphenoid. In both cases the metal had penetrated the orbit and imbedded itself in the sphenoidal sinus of the opposite side. The first case died of meningitis, despite the removal of the foreign body and free drainage of the sinus. In the second case the eye was lost but the patient recovered and the metal was removed intranasally under a local anæsthetic. In some cases the walls of the orbit have become deficient owing to a co-existing lesion of a sinus. Thus an orbit may be drained through its floor into the antrum and the antrum into the nose. Again the ethmoid may be destroyed so that the inner wall is lacking. In neither of these have I seen disturbance of the movements of the eye or dislocation of the eyeball.

Some years ago Mr. Hunter Tod showed a case in our Section in which the left eyeball had dropped through the floor of the orbit, so that half of it was in the antrum. The history of the case was vague, but as far as the exhibitor could ascertain some operation on the antrum and ethmoids had been performed. I have been expecting such a case from a gunshot wound, but have not yet found one, and presumably this is due to the fact that the suspensory ligament remains intact. In a wax cast shown, a gunshot wound had destroyed the bridge of the nose, opened up both frontal sinuses, and caused a pan-sinusitis (*see* Case 5). I was struck by the fact that although under an anæsthetic, the inner bony wall of both orbits was lacking, and both eyes could be made to bulge by pressure of the finger in the ethmoidal regions, there was a total absence of diplopia, or any lack of co-ordination of the eyes.

In severe damage involving the floor of the frontal sinus, with deficiency of the roof the orbit, the eye has usually been removed. In some of these severe injuries, the frontal sinus and ethmoid communicate with the orbit; free intranasal drainage should then be established.

Lachrymal sac suppuration is a not uncommon result of wounds of the nose. If the orbit, ethmoids and lachrymal sac are damaged directly, a combined operation with free intranasal drainage is done. In a number of cases, wounds of the bridge of the nose, especially those affecting the nasal processes of the superior maxilla, cause chronic dacryocystitis. More than fifty cases have been operated on in a year in the Ear, Nose and Throat Department, Queen's Hospital, by my colleague, Mr. Lawson Whale, and myself. The method employed as a routine has been to cut directly down on the sac, dissect it out, and then open through the lachrymal bone into the nose. If any co-existing ethmoiditis was present, the ethmoidal cells affected were also removed by this route. A tube was passed, with one end in the sac cavity and the other protruding from the nostrils and sutured there. The external incision was sutured and the tube removed in twenty-four hours. In every case the external wound healed well. Owing to the disturbed anatomy of the parts the intranasal operation was generally contra-indicated. After the completion of the preliminary treatment and the cure of suppuration, the plastic repair of the orbit and sinuses has to be undertaken.

I think I cannot do better than to show a few typical cases to illustrate methods. Major Gillies has already read a paper on the plastic surgery of the eyelids, together with his use of von Esser's inlay for the treatment of loss and deformity of the lids, so I will confine myself to the treatment of the combined repair of accessory sinuses and eye-sockets.

EPIDIASCOPIC DEMONSTRATION.

The first five cases I have to show are those of gunshot wounds involving the frontal sinus and orbit.

Case 1 is that of a patient in whom the right eye had been removed. There was an open wound of the frontal sinus, the condition was one of a sloughing wound with pus and granulations. The patient's condition was not good, and he had a temperature running from 101° to 104° F. I turned a frontal flap up and exposed the anterior wall of the frontal sinus. The cavity was full of pus and polypi, and the bony floor of the sinus and roof of the orbit behind it were lacking. The meninges were bulging and covered with granulations. I made a wide drainage into the nasal cavity, removing most of the labyrinth, and then removed the remains of the mucous membrane of the orbit. The frontal sinus and orbit were thus drained into the nose, and the forehead flap was brought down and sutured to the lower lid. The patient did well, and the external wound healed. There is no nasal discharge, and he is now being fitted with a prosthetic eye-shield carrying an artificial eye (figs. 1, 2, p. xvi).

Case 2 was a similar case, in which Mr. Lawson Whale did the radical frontal sinus operation, draining orbit and frontal sinus into the nose. The wound has healed, and the patient is under my care for plastic treatment. The malar bone, which was lost, is being replaced by a costal cartilage graft, and I hope to be able to reproduce a socket which will carry an artificial eye (figs. 3, 4, p. xvi).

Case 3 is one in which both frontal sinuses were opened by a wound and the right eye had been enucleated. An obliterative operation has been done on both frontal sinuses and a plastic operation has been performed by sliding down a forehead flap to remove the forehead deformity (figs. 5, 6, p. xvii).

Case 4 is a similar case. The obliterative operation on both frontal sinuses was carried out by Captain Ryland at the Cambridge Hospital, Aldershot. I have done a plastic operation for the removal of the frontal deformity, and have readjusted the eye-socket so that an artificial eye can be worn. A rhinoplasty was done for the existing destruction of tip and alæ of the nose (figs. 7, 8, p. xvii).

Case 5.—The nasal cavity had been opened by a fragment of shrapnel which had opened up both frontal sinuses, fracturing the posterior wall of the right one and remaining embedded in the upper lip. The patient had a pan-sinusitis, and all the nasal accessory sinuses have been operated on. Despite the total loss of the inner walls of the orbit, the patient has had no diplopia or other eye symptoms (figs. 9, 10, p. xviii).

The next three cases are those of involvement of ethmoid and orbit.

Case 6.—In this case the right orbit and bridge of nose had been damaged by a wound. There was a suppurative ethmoiditis. After a series of operations by Captain Aymard and myself, the patient has an eye-socket which carries a good artificial eye and a fairly successful rhinoplasty (figs. 11-14, pp. xviii, xix).

Case 7 is that of an officer whose eye-socket and nasal cavity were in communication. There was suppuration of the right ethmoidal cells. The photographs before and after operation show the result of the plastic operations and the marked cast shows the flaps employed (figs. 15, 16, 17, pp. xix, xx).

Case 8.—In this case the lower lid was drawn down and the conjunctival membrane was spread out flat, so that there was no lower portion of the eye-socket. The root of the nose was destroyed and there was suppuration of the anterior ethmoidal cells. After asepsis of the nasal cavity had been obtained, a rhinoplasty and reconstruction of the socket was carried out, and the photograph shows the result obtained (figs. 18, 19, p. xx).

The next six cases are those of damage of the antrum associated with a lesion of the orbit.

Case 9.—In this case the remains of the antrum had been removed and the left eye enucleated in France. The malar bone and infra-orbital margin were lacking. The eye-socket was modelled and a costal cartilage malar inserted.

Case 10.—In this case of a bullet wound of nose, antrum and left orbit, a plastic operation on the opening of antrum into cheek was done, intranasal drainage of the antrum was established, and a rhinoplasty for the restoration of the bridge was performed by the subcutaneous implantation of a cartilaginous bridge. An artificial eye has been fitted (figs. 20, 21, pp. xx, xxi).

Case 11 is one in which the zygoma, malar and antrum were destroyed together with the right eye, a portion of the nose, and columnella. The inner canthus was drawn down to the region of the right ala. The eye socket was brought up so that the inner canthus was in correct position. The case is under treatment for the restoration of the cheek by means of a pedicle chest flap (figs. 22, 23, p. xxi).

Case 12 is a similar case in which, in addition to the loss of cheek and antrum, the nose has been partially destroyed and also the lower lid. The upper lid hung down as a dependent œdematous mass. A socket was made out of the upper lid, the underlying mucous membrane of the latter being brought up to form the lining. A chest flap for nose and cheek has been brought up (figs. 24-26, pp. xxi, xxii).

Case 13.—In this case the orbit, antrum and nasal cavity were in connexion by an external opening. An Esser's inlay was placed in the forehead and the epithelialized flap was brought down and twisted into the cavity so that it lined the floor of the orbit, the antrum, and the nasal cavity with skin. The remains of the lower lid were brought down over this and an artificial eye fitted (figs. 27, 28, p. xxii).

INJURIES OF THE ORBIT WITH CHRONIC DACRYOCYSTITIS.

Case 14 is one of gunshot wound of the left orbit with a puckered scar and fistula between the sac and the surface. The photographs show the case before operation, and five days and ten days after. It demonstrates the absence of scarring possibly due to the excellent healing associated with the method of intranasal drainage employed (figs. 29-31, p. xxiii).

Case 15.—The sac in this case was removed and the eye-socket reconstituted as in Case 9 (figs. 32, 33, pp. xxiii, xxiv).

Case 16 illustrates a rhinoplasty for the pug-nose type together with the adjustment of eye and eye-socket. The inner canthus was drawn down towards the ala. There was a suppurating right sac and right antrum. After these had been dealt with the rhinoplasty was carried out. The eyeball was drawn down so producing a marked internal and downwards squint. The enlarged photograph of the eye shows a symblepharon which appeared as a rounded cord passing from the margin of the iris to the inner canthus. On bringing up the inner canthus, the symblepharon disappeared, and the eye, although blind, had a good appearance (figs. 34, 35, p. xxiv).

Case 17 shows a case of rhinoplasty and reconstitution of the left lower lid by means of a reversed pedicle forehead flap. In reversing the pedicle a few hairs from the right eyebrow were included so as to make eyelashes for the lower lid (figs. 36-38, pp. xxiv, xxv).

Case 18 is one in which the eye-socket has been obliterated and a prosthetic shield carrying an artificial eye has been fitted (figs. 39, 40, p. xxv).

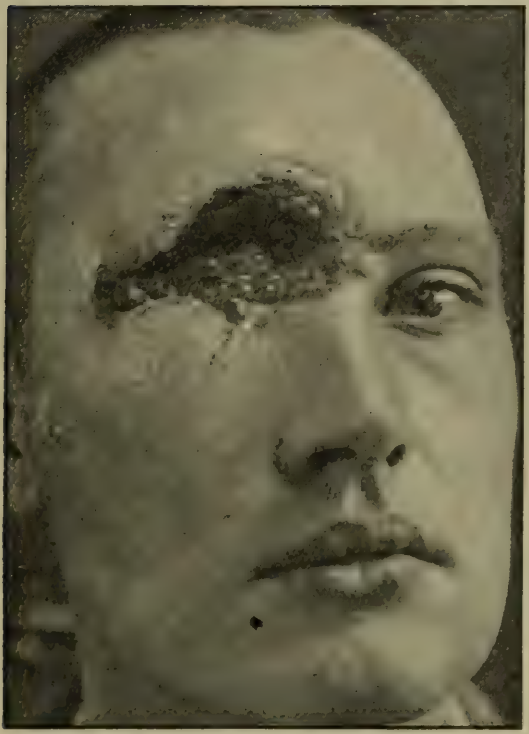

FIG. 1 Case I).

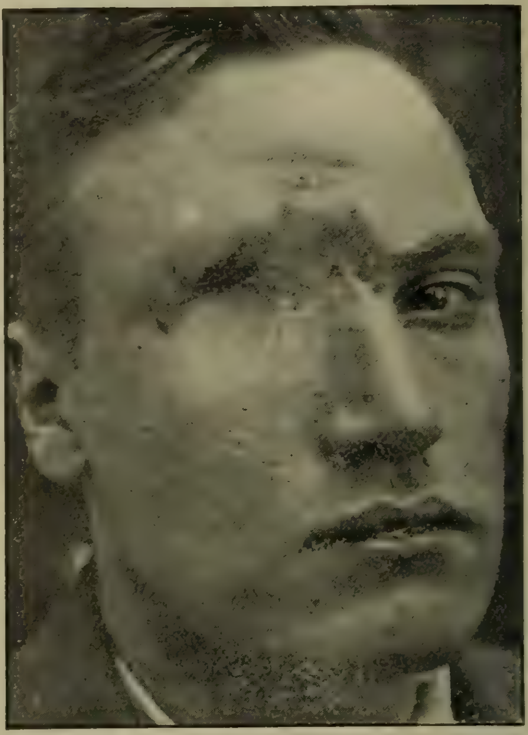

FIG. 2 (Case I).

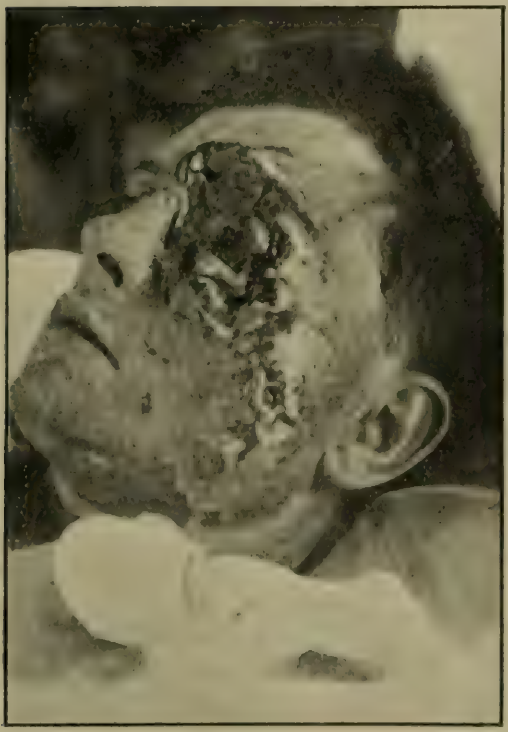

FIG. 3 (Case II).

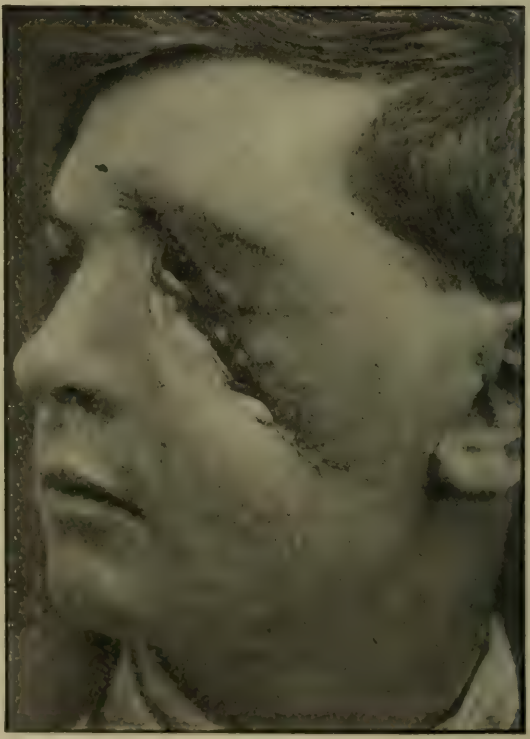

FIG. 4 (Case II).

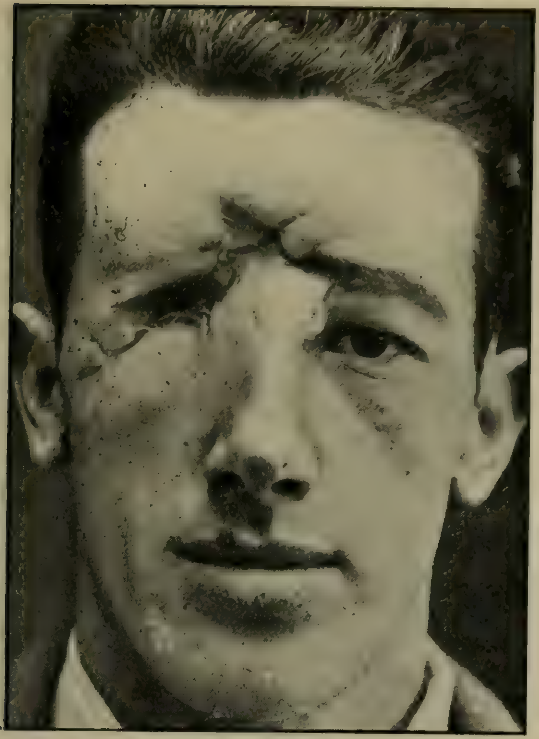

FIG. 5 (Case III).

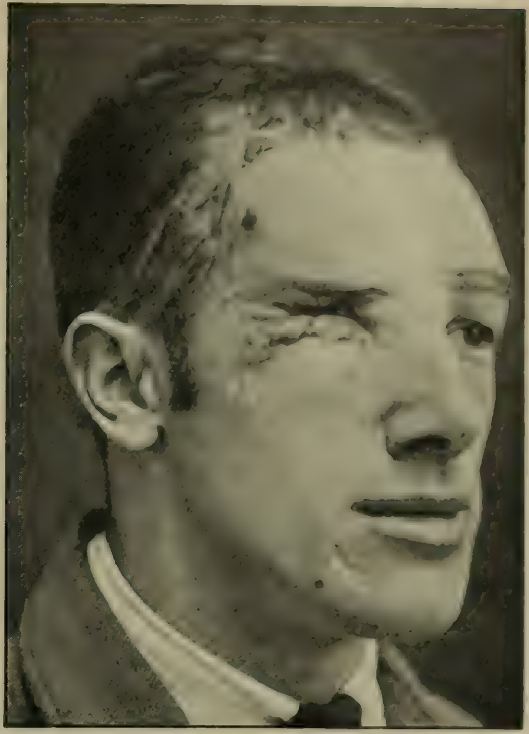

FIG. 6 (Case III)

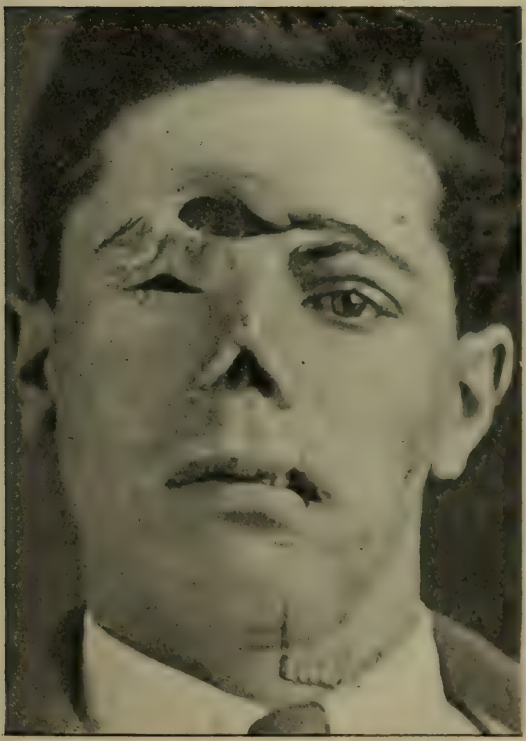

FIG. 7 (Case IV).

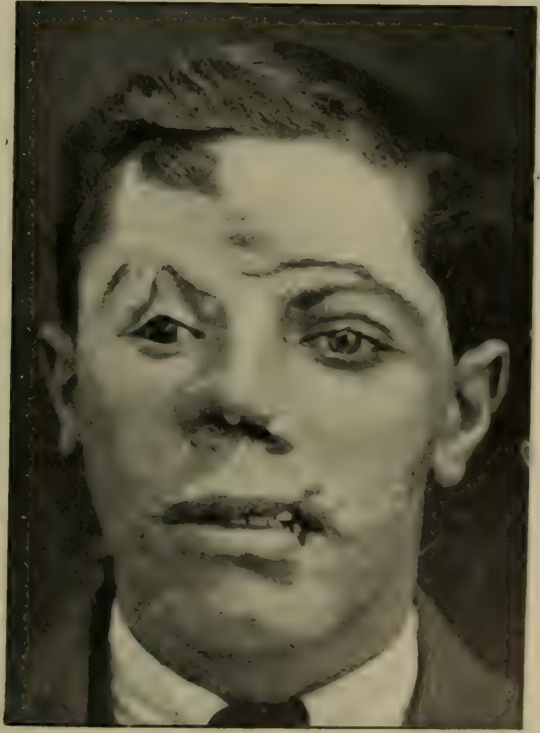

FIG. 8 (Case IV).

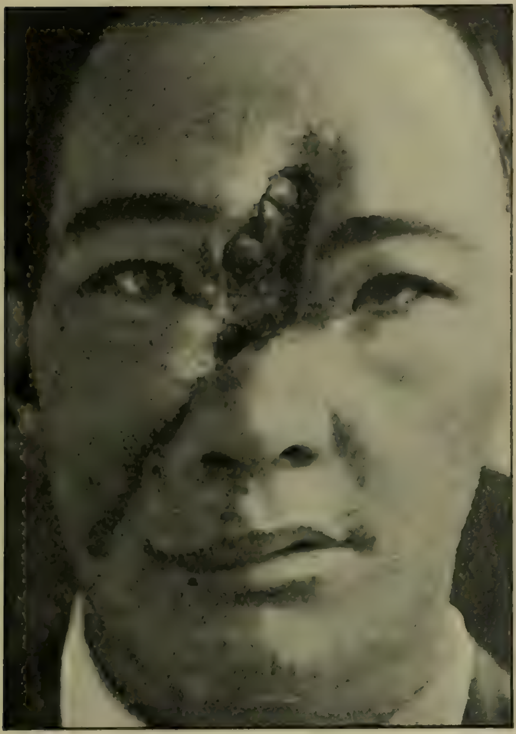

FIG. 9 (Case V).

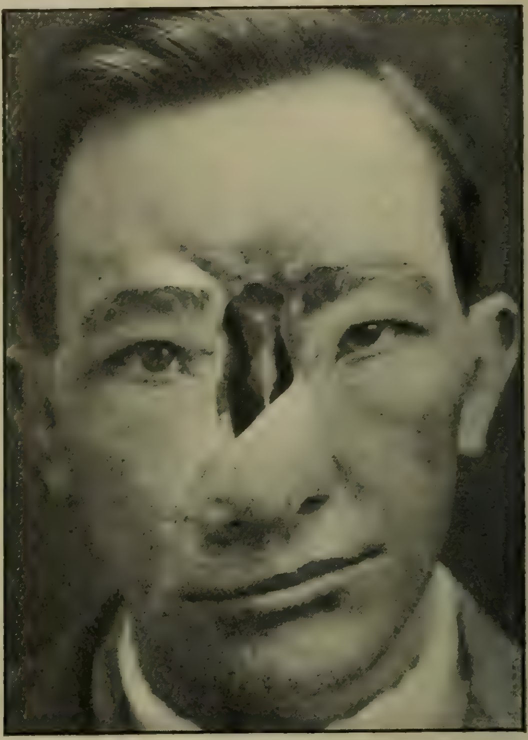

FIG. 10 (Case V).

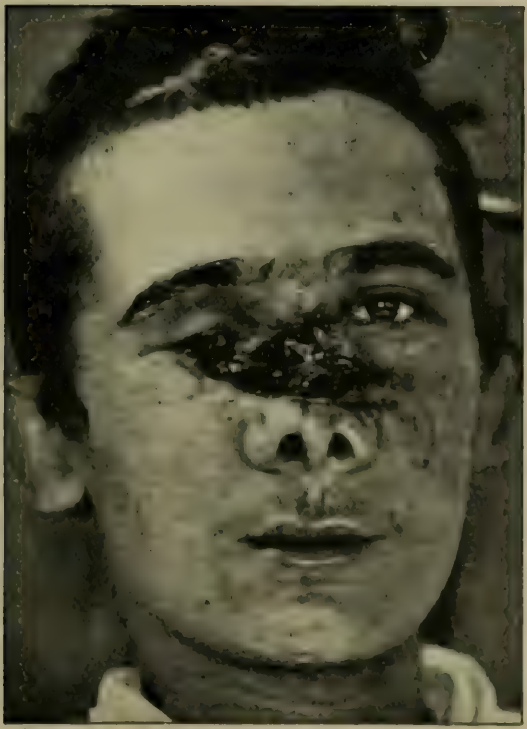

FIG. 11 (Case VI).

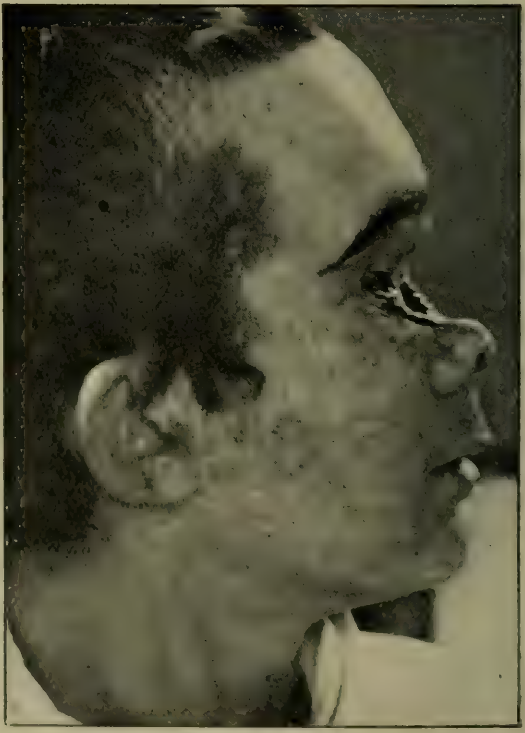

FIG. 12 (Case VI).

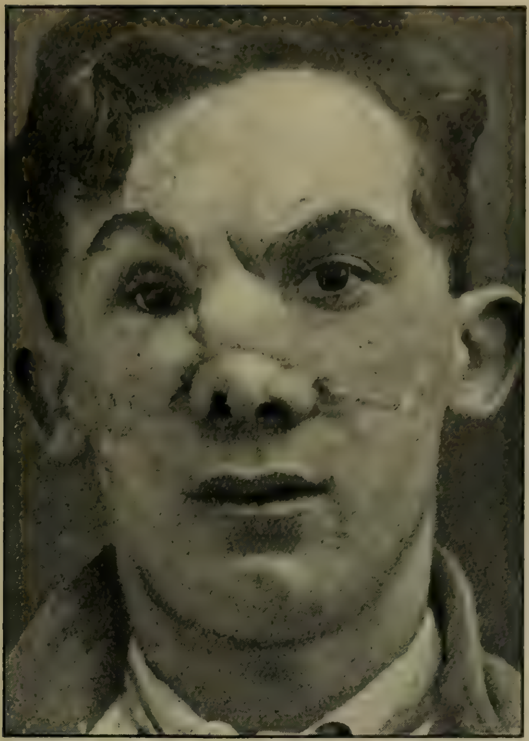

FIG. 13 (Case VI).

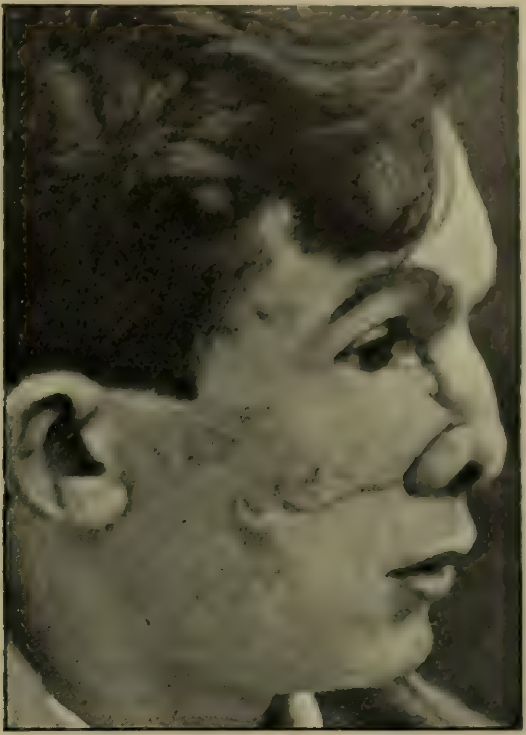

FIG. 14 (Case VI).

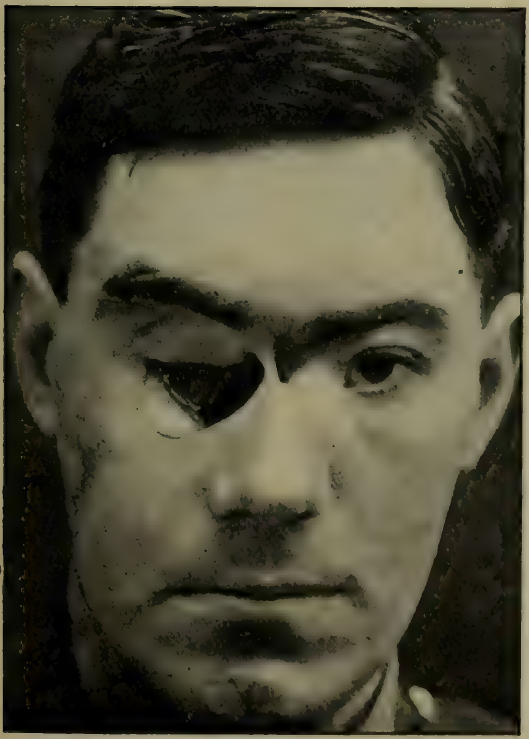

FIG. 15 (Case VII).

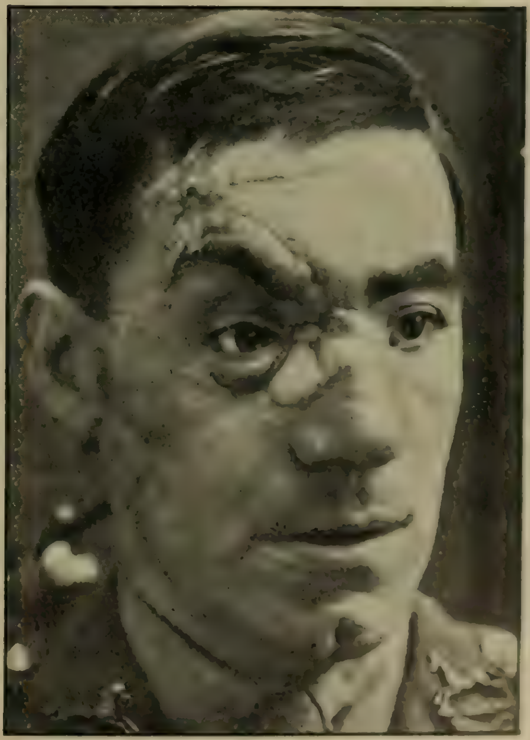

FIG. 16 (Case VII).

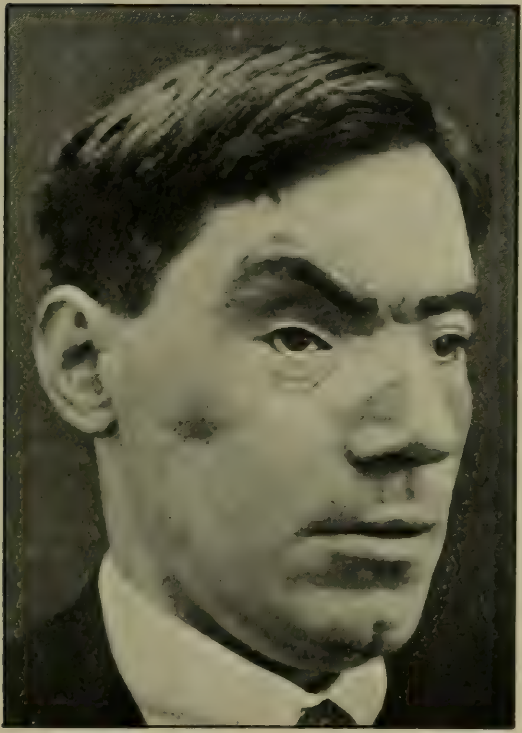

Fig. 17 (Case VII).

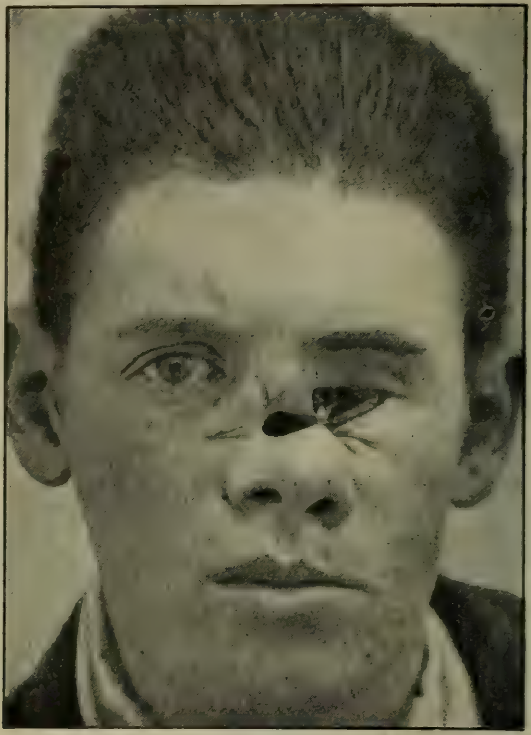

Fig. 18 (Case VIII).

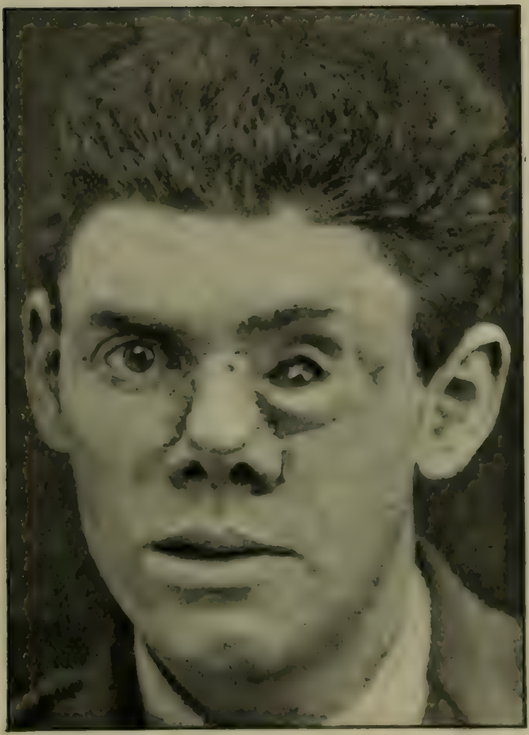

Fig. 19 (Case VIII).

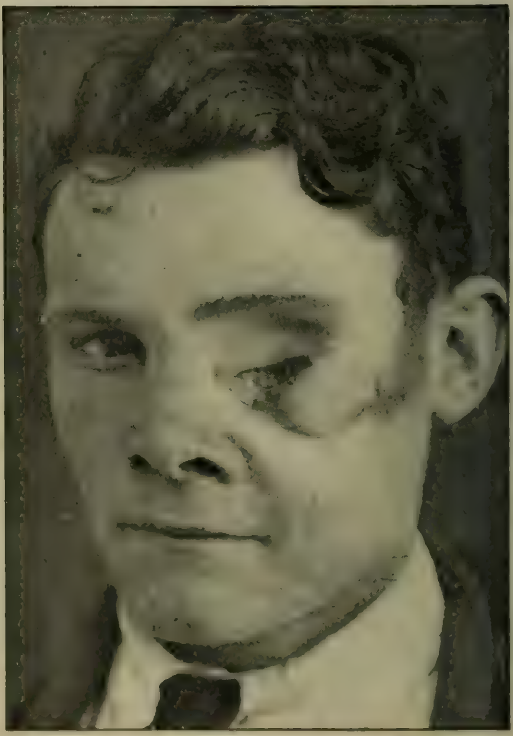

Fig. 20 (Case X).

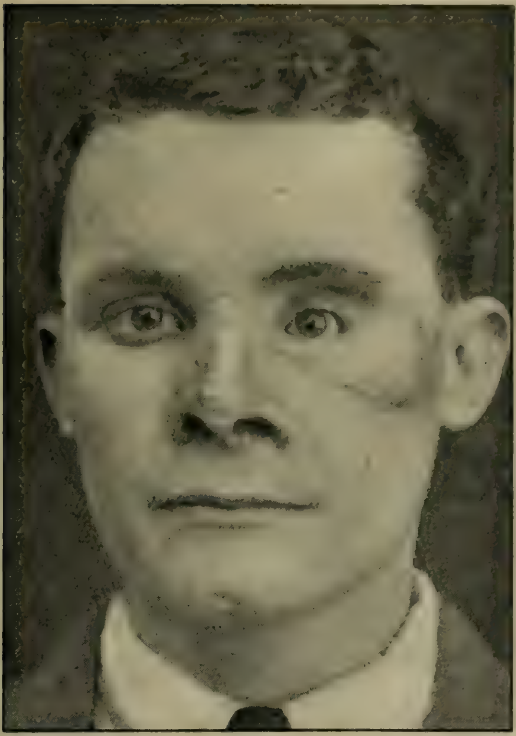

FIG. 21 (Case X).

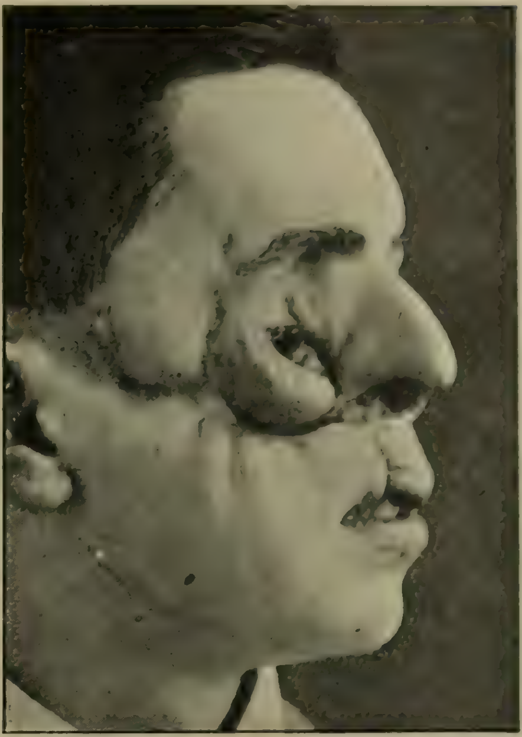

FIG. 22 (Case XI).

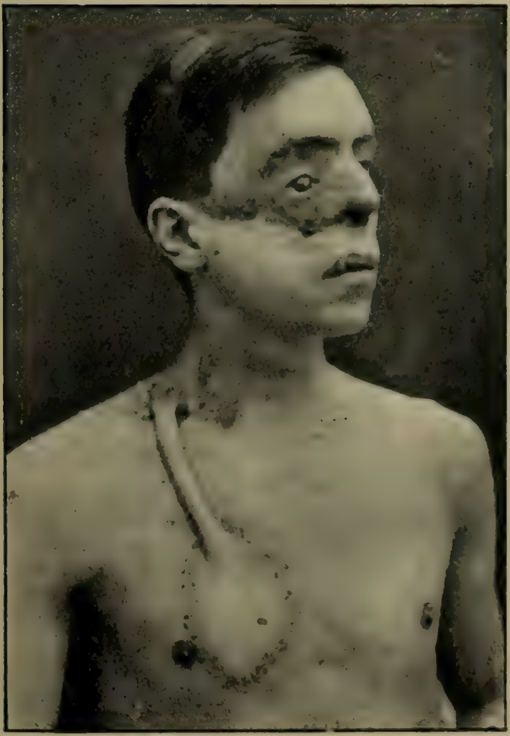

FIG. 23 (Case XI).

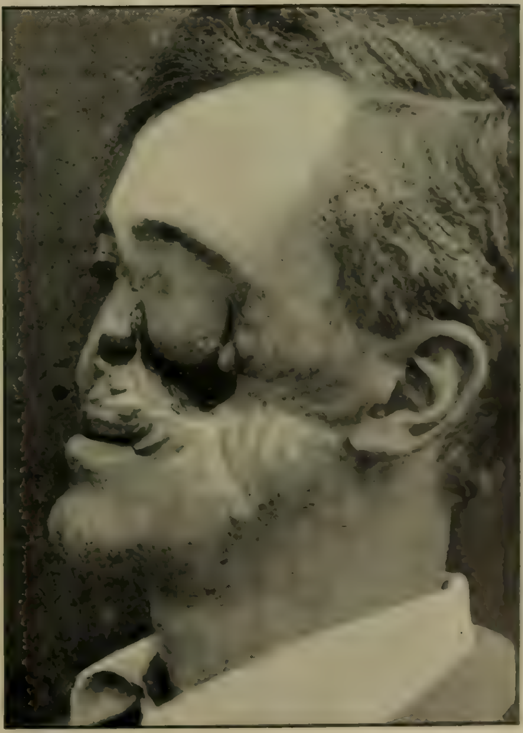

FIG. 24 (Case XII).

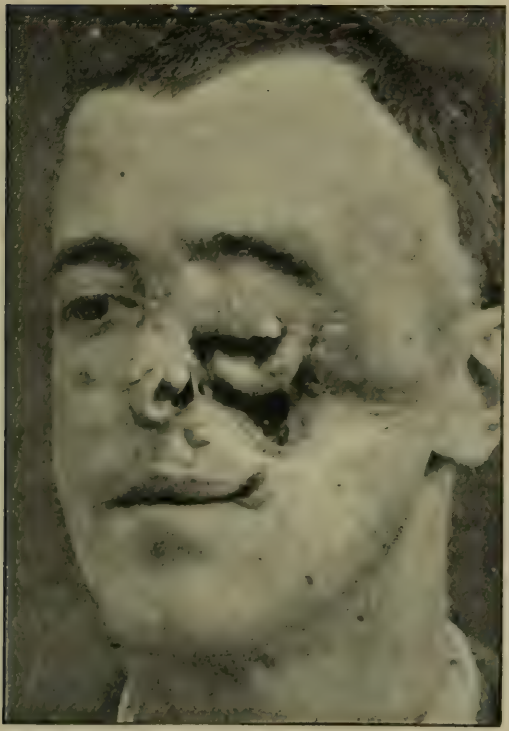

FIG. 25 (Case XII).

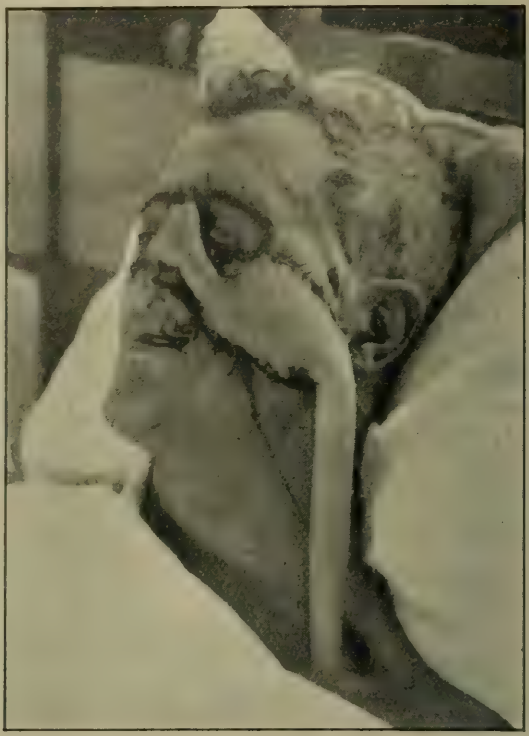

FIG. 26 (Case XII).

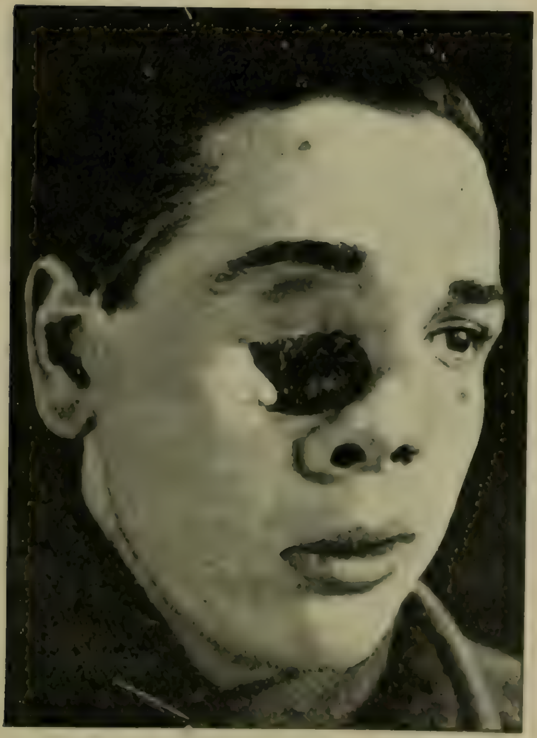

FIG. 27 (Case XIII).

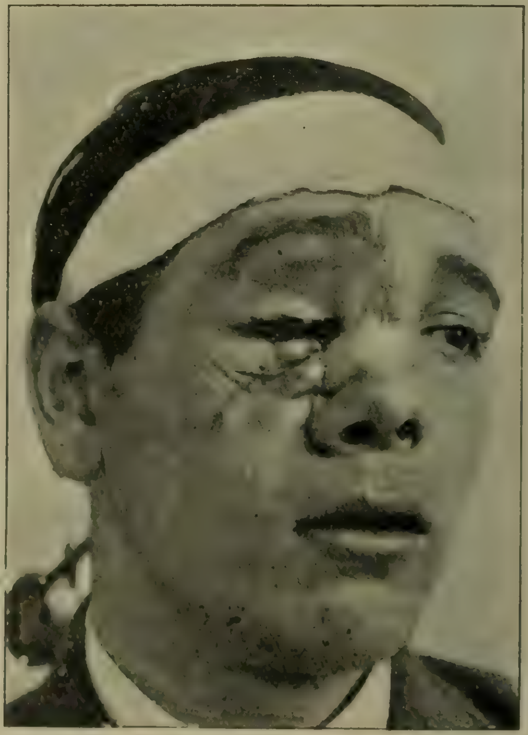

FIG. 28 (Case XIII).

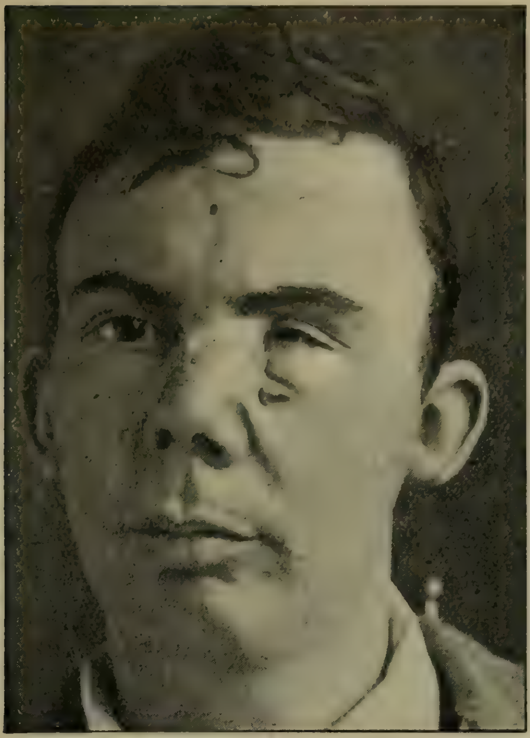

FIG. 29 (Case XIV).

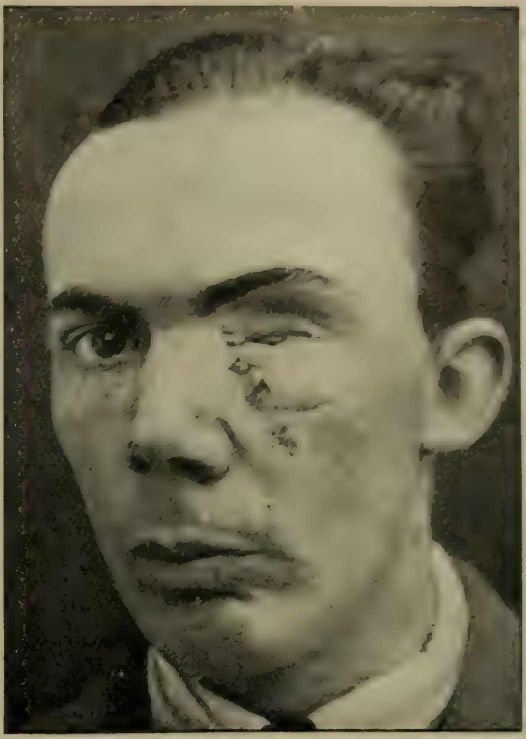

FIG. 30 (Case XIV).

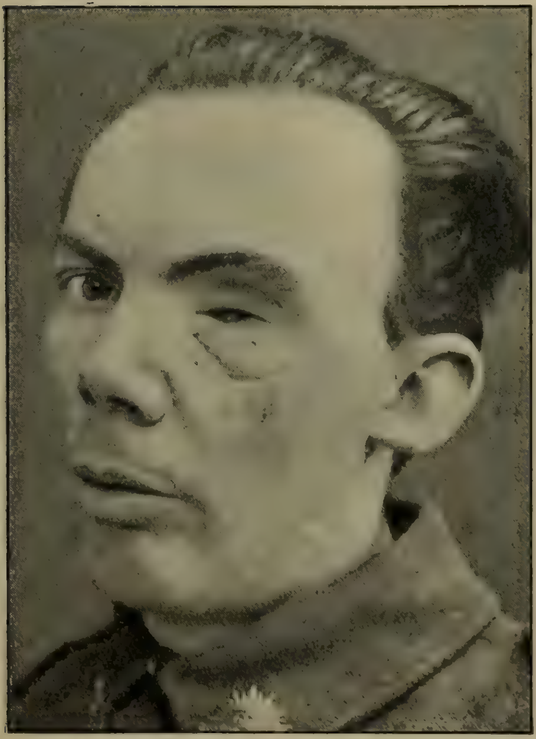

FIG. 31 (Case XIV).

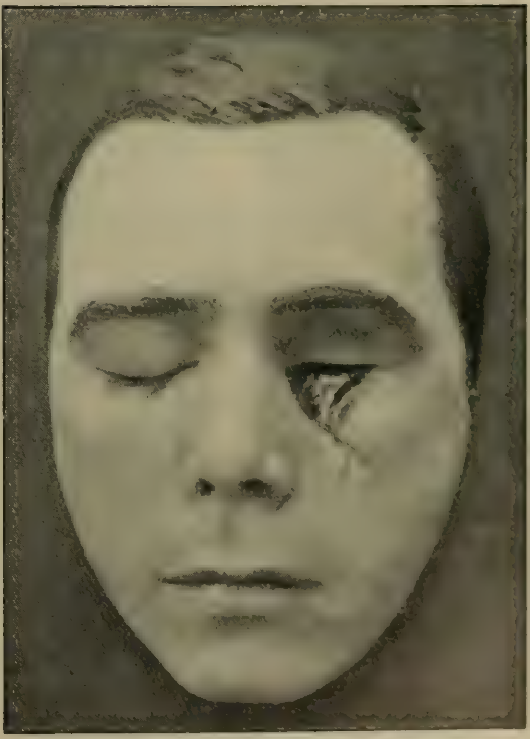

FIG. 32 (Case XV).

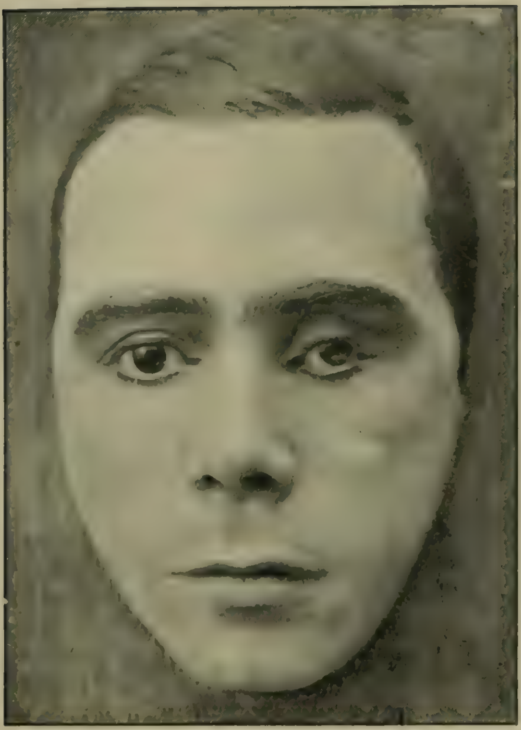

FIG. 33 (Case XV).

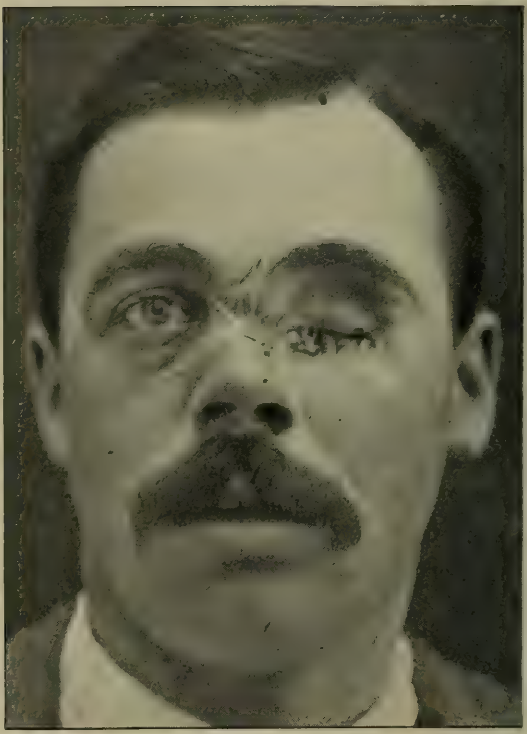

FIG. 36 (Case XVII).

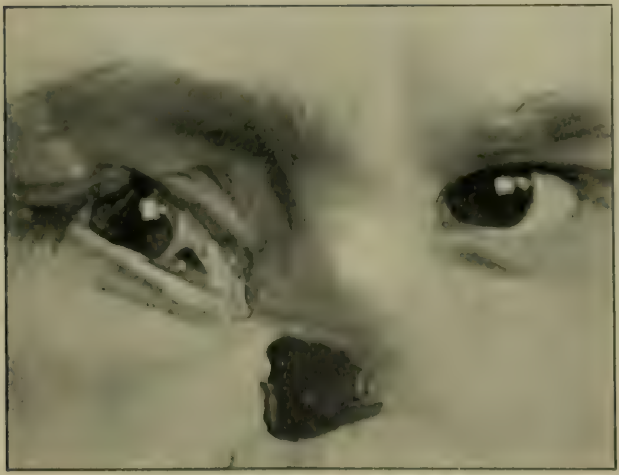

FIG. 34 (Case XVI).

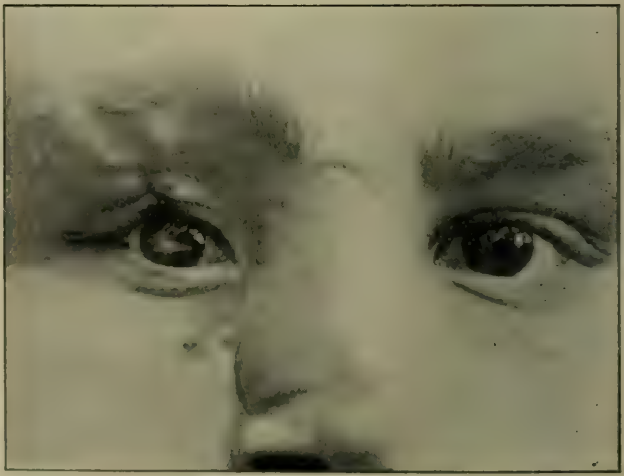

FIG. 35 (Case XVI).

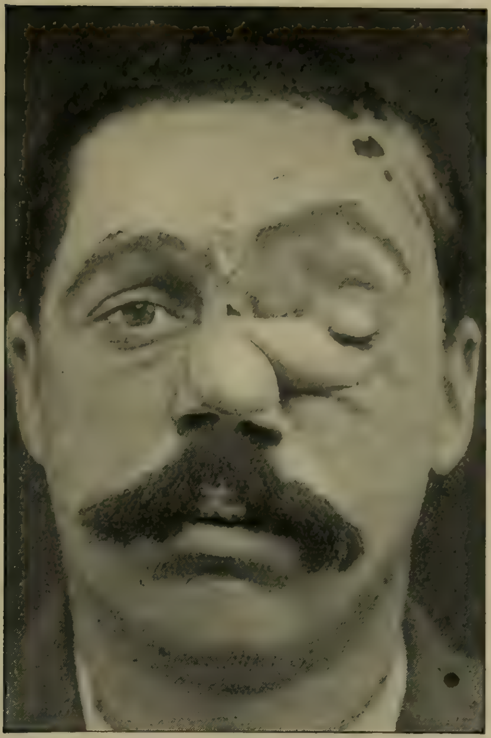

FIG. 37 (Case XVII).

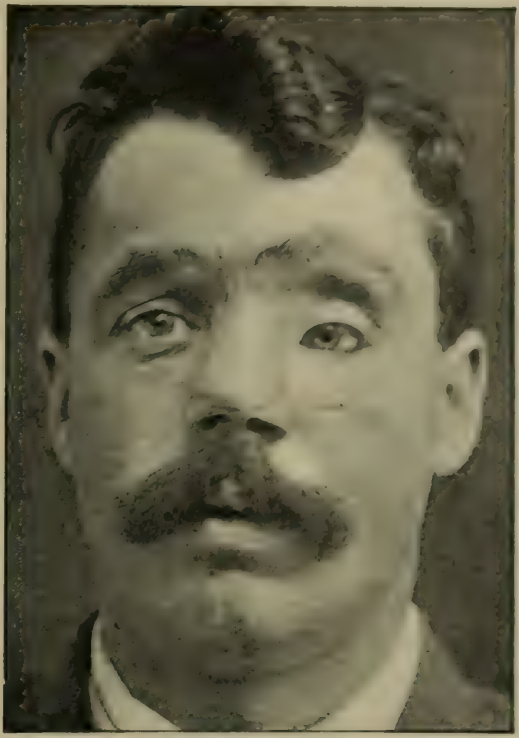

FIG. 38 (Case XVII).

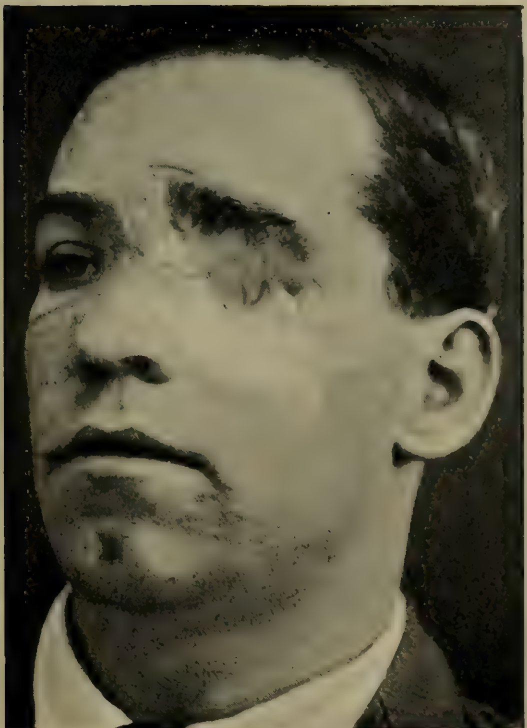

FIG. 39 (Case XVIII).

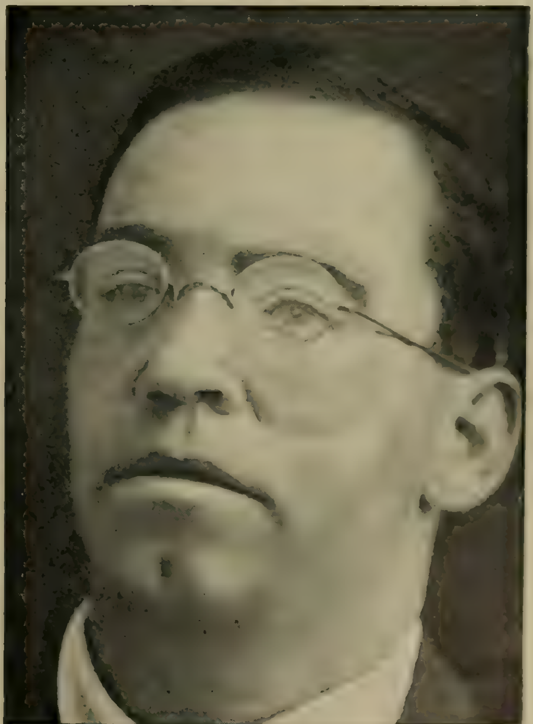

FIG. 40 (Case XVIII).

The conclusions to which I have come with regard to the treatment of injuries of the orbit and accessory sinuses are the following: In wounds of the frontal sinus, the cavities should be laid widely open as a rule and the obliterative operation performed if possible. The subsequent plastic operation by sliding down a forehead flap is easy and effective. Cartilage can be inserted to form a brow ridge subsequently. Wounds of the lid should be treated by preserving any remnants of the latter and stitching remains of conjunctival mucous membrane to skin. Wounds of the ethmoidal region should be treated by curetting and obtaining free intranasal drainage. Wounds of the antral cavity should always have free intranasal drainage, and if the cavity is comminuted or contains foreign bodies these should be removed by doing a Caldwell-Luc operation. Openings through the gingivo-labial fold should be sutured so as to prevent a fistula between mouth and antrum, as these are often difficult to close subsequently.

It has been the boast of some rhinologists that they are never satisfied when removing suppurating ethmoidal cells until orbital fat is removed by the curette.

The safety of operations on the frontal sinus and ethmoids probably consists in the free intranasal drainage established. In traumatic cases of lachrymal sac suppuration as mentioned above, ethmoidal suppuration frequently co-exists. The differential diagnosis of the two, especially in cases of tubercular ethmoiditis in children where the abscess points below the inner canthus, must be borne in mind.

INFLAMMATORY DISEASES OF THE ORBIT AND ACCESSORY SINUSES.

One symptom which may be of orbital or nasal origin and in which the differential diagnosis is important is that of frontal headache. In frontal headache of nasal origin the cause may be a frontal sinus inflammation or pressure in the middle meatus. The characteristic of frontal sinus headache is the associated tenderness over the inner end of the eyebrow. If associated with intranasal physical signs such as a streak of pus coming from beneath the anterior end of the turbinal, or polypi in this region, the diagnosis is strengthened and a radiogram will generally confirm the diagnosis. So too, the typical headache relieved after the discharge of pus or after washing out pus from the cavity is a useful aid. The routine examination of the eyes in suspected cases and also of the nose should be insisted on in all such cases and much valuable information would thereby be gained.

Apart from actual suppuration of the frontal sinus, a severe headache of nasal origin may be caused by the pressure of a hypertrophied or congested middle turbinal against the septum and these headaches are often cured by the removal of the anterior end of the middle turbinal with or without a submucous resection of a septum whose deviation causes obstruction in the middle meatal region. Ethmoidal inflammation may cause headache, particularly at the root of the nose and antral suppuration may also cause frontal headache. Retrobulbar neuritis and nasal obstruction or inflammation of the accessory sinuses form a very interesting study about which many conflicting opinions are held, some observers holding that the majority of cases are of nasal origin and when a cure of the condition is obtained after intranasal operation, ascribe it to the treatment, while others hold that there is a very infrequent connexion between the two and that a retrobulbar neuritis frequently becomes cured spontaneously and that the intranasal operation is given the credit of what would occur if no operation had been performed. Again the disappearance of the retrobulbar neuritis, with or without operation, may be the first sign of a sclerosis which may occur later on.

In a case published by Mr. Henderson and myself, a girl had left-sided optic neuritis with left-sided nasal obstruction due to a hypertrophied left middle turbinal. The turbinal was removed and the sphenoidal sinus found healthy. There was some inspissated secretion between the middle turbinal and the ethmoid, but no chronic suppurative disease of the latter. The patient rapidly recovered from her optic neuritis after the operation and has remained well.

Recently, in an American journal, a point has been raised that hypertrophy of the ethmoid without suppuration may be a cause of retrobulbar neuritis. The inactivity of the orbit from cellulitis after radical procedures on the frontal sinus and ethmoid is marked. The orbital fat is allowed to bulge into the frontal sinus by removing the lining of the latter and apparently without producing any ill-effects.

I should like to acknowledge my indebtedness to Major Carruthers for his skilled help and advice as to the treatment of eye conditions, in the treatment of patients under my care at the Queen's Hospital, Sidcup; to Mr. Wabridge, for his excellent photographic records of my cases; to Lieutenant Edwards, the sculptor to the Queen's Hospital, for the casts he has made of the cases and for the models

showing the contour which should be aimed at, and to Mr. Scott, the artist at the museum, for his life-like representation in the painting of the wax casts which I have been able to show at the meeting.

Mr. ARTHUR W. ORMOND, F.R.C.S.

I am afraid I feel a certain sense of disappointment in the conclusions to which I have come—namely, that the result of my investigations has proved negative rather than supplying some link in the chain of evidence leading to fresh conclusions. I will, however, lay before you the facts which are forthcoming after a close scrutiny of a large amount of material.

As during the last four and half years I have been mainly occupied in looking after soldiers, my remarks will be largely based on the mass of clinical material collected from cases seen at the Second London General Hospital. Injuries involving the orbits and the accessory sinuses have been common; several hundred of such cases having been admitted into the ophthalmic wards. I have selected 100 cases from amongst my notes to form the basis of my remarks and these we may for convenience divide into groups according to the sinuses involved; but before passing to particulars I would like to say something of the general symptoms to be found in these cases.

It cannot be claimed that serious damage to the orbits and accessory sinuses results in any subtle changes in the vision; the ocular symptoms are almost invariably the result of the original wound, or consequent on some inflammatory change which is gross and obvious. In some instances a slight degree of optic neuritis in the uninjured eye was exhibited, and most complained of asthenopic symptoms on attempting the use of the eye for reading or "close" work, but beyond this the influence upon the eye from severe damage to the accessory sinuses was certainly small.

I have observed no definite objective signs and even in the cases referred to, the conclusions are open to criticism, as in some instances the ear or the cranial cavity was also injured. Pain arising from inflammation in the sinuses is sometimes referred by the patient to his eye, and in two cases blind eyes were removed on account of pain which was really due not to the ocular but to the nasal condition as subsequent events proved. Some cases of glaucoma in association with sinus trouble not the result of injury have been seen.

The most frequent symptom in the *early* stages of involvement of the accessory sinuses in orbital wounds is bleeding from the nose or bleeding into the posterior part of the orbit producing proptosis and chemosis of the conjunctiva; the main evidence, however, of the involvement of the sinus consists in the direction of the missile and if we reconstruct the formation of the wound we can usually conclude which of the accessory sinuses is involved.

In the *later* stages we may find persistent suppuration into the eye socket or externally through a sinus, leading directly into one of the accessory cavities; also acute inflammatory œdema and cellulitis with or without abscess formation, and the attendant symptoms of acute sinusitis. We note too mucoceles and various subjective symptoms such as pain and sensations of fullness and throbbing in the bones of the face, as also asthenopic symptoms in the uninjured eye when used for reading or "close" work. Frequent, too, are discharges of pus and muco-pus from the nose or into the throat, foul smells or unpleasant tastes, anosmia, stuffiness in nasal breathing, polypi, pus in the meatuses, deflections or adhesions of the turbinal bones, vertigo and asthma. The rarer and possibly only associated symptoms of sinus trouble such as glaucoma, iritis, uveitis, &c., also appear but it is open to considerable question whether their existence is due to injury. Optic neuritis, central scotomata and choroiditis have also been remarked.

The area of the face involved lies between a horizontal line drawn through the frontal lobes just above the upper surface of the roof of the orbits and a line drawn horizontally through the maxillary sinuses. Above this line the injury if not immediately fatal would probably not involve the orbits at all and below the line also the eyes and orbits usually escape any direct damage. A perforating wound through the temporal fossæ, traversing the apices of both orbits, inflicts the greatest damage to vision with the least disfigurement, whereas those wounds which strike the great buttresses of the orbit—the malar bones or the external angular process with its continuation backwards—result in considerable destruction, but their resistance and power of dissipating the shock protect the globes and in some cases one eye escapes entirely. In the former case the missile usually injures the optic nerve and causes one of those extensive injuries to the intra-ocular membranes by which the retina and choroid are completely severed in a circular tear around the optic disk. A mere glance at the bony skull will show how thin are the tissues and what slight resistance is offered to a penetrating wound in this direction: it is extremely difficult after a short time to discover the entrance or the exit hole, and provided the eyes remain *in situ*, there is no disfigurement. The sinuses involved in this kind of wound are the ethmoidal and the symptoms most frequently met with are anosmia, nasal obstruction due to synechiæ, muco-purulent and purulent discharge into the nose and sometimes subsequent mucocele or abscess formation; but a suprisingly large number of the men made no complaint even when questioned closely, and were apparently unconscious of anything untoward.

If we now consider the different groups into which these cases have been divided, according to the sinus or sinuses involved, we find that:—

TWO OR MORE OF THE ACCESSORY SINUSES INVOLVED.

Of these 100 men twenty-one have *two or more* of the accessory sinuses injured; the ethmoid and one maxillary antrum being usually combined, but sometimes also the ethmoid and one frontal. An oblique wound may involve as many as four sinuses—the antrum, ethmoid, lachrymal, and frontal, as in Cases 70, 95, and 76—but this is rare. Sooner or later, and in fact sometimes months after, these sinus cases show signs of obstruction to the drainage of these cavities, with consequent formation of mucoceles or abscesses, and at the present moment a large proportion of the blind men requiring treatment are cases of nasal obstruction, nasal discharge, or acute inflammation with abscess formation.

The ocular condition, where the eyes are not completely destroyed, seems to be usually either: (1) That the eye escapes all damage on one or both sides (Nos. 73, 74); (2) that the optic nerve is directly damaged, resulting in atrophy; or (3) that a rupture of the internal tissues of the eye leads to large intra-ocular hæmorrhages, ruptures of choroid, or detachment of the retina. There seems to me to be very little evidence that the presence of pus in the sinuses, severe damage to the bony walls, rents of the mucous membrane, adhesions or obstruction to the airway, have any effect at all upon the ocular conditions. Of course it may be argued that the fine changes in the eye, often attributed to nasal sinus disease, such as small scotomata, slight neuritis, &c., are not likely to be observed in eyes so grossly damaged as are most of the eyes in these cases, but a fair number of unilateral cases have been watched, in which one eye has entirely escaped any material damage, and these are as negative in their evidence as are eyes that are badly injured.

(83) A. B., wounded March 25, 1918, on the Somme. Entrance wound above outer end of left eyebrow. Exit through right eyebrow. Severe pain. Frontal bone comminuted. Temperature 104° F. Eyelids œdematous. Both pupils dilated and fixed. He recovered sufficiently to be transferred to St. Dunstan's in May. A month later the note made was: right eye blind: rupture of choroid. Left eye: part of optic nerve torn; rupture of choroid below disk, a small field of vision below and to the outer side. No smell. Copious discharge at back of throat and nose, severe sneezing, acute œdema of skin around left orbit. He was readmitted to the Second London Hospital, and was operated on by Captain Howarth—both frontal sinuses being drained into the nose. He improved very much after this, and his vision became equal to seeing sufficiently to get about, and he remained well until this last week, when he had a recurrence of pain and œdema of the skin about the orbits, and was operated on by Mr. Hastings.

F. H., wounded at Suvla Bay November 29, 1915. Shrapnel entered over left eyebrow, and was removed from a point just below the right ear. He was unconscious for a fortnight. In January, 1916, my note was: Right eye, optic atrophy, with a small field of vision below. Left eye: full of blood, organizing in places; rupture of the choroid. Nasal discharge more on right side than on left. No smell. In June the condition had improved very much, and he learnt massage at St. Dunstan's sufficiently to enable him to "carry on" as a masseur. In August, 1918, he came to me complaining of severe pain in his left eye when stooping down and when at work. This was so severe that he asked me to remove his left eye. I temporized for a while, but eventually removed the eye at his earnest solicitation. The pain was not relieved, and a month later the nasal discharge started again, and I asked Captain Howarth to see him. Captain Howarth found some trouble in the ethmoidal cells which showed signs of necrosis. The pain disappeared after removal of the necrosed ethmoid. The left eye was examined and photographed for me by Professor Thomson, of Oxford.

W. B., wounded April 25, 1918, on the Somme, by a piece of shrapnel, which struck the bridge of the nose on the right side and travelled to the left and backwards, destroying the left orbit and eye and left temporal region. The right eye escaped, and showed no evidence of disease at any time. He had a piece of metal in the scar of the left orbit, some nasal obstruction and discharge on the left side, with an increased density in the left antrum, as shown by X-rays.

SPHENOIDAL.

There are seven of my cases in which the sphenoid is directly involved, or a piece of metal is so close to the sinus, and of such a size that the sinus was certainly implicated. In two the optic nerve was severed, and in two the levator palpebræ superioris and the superior rectus were paralysed. Nasal symptoms were entirely absent in all these cases, except that bleeding from the nose occurred in one instance for a short time after the receipt of the wound. The presence of a large piece of metal in or close to the sphenoidal sinus seems to be borne with great tolerance. One such, Case (6), is an orderly, now working at St. Dunstan's, who has no symptoms referable to the condition at all. The most interesting cases are 3, 5, and 6:—

(5) G. W., wounded at Cambrai, September 29, 1918, by shell. Has a scar on right eyebrow. Complete ptosis of right lid with injury to superior rectus. Complete optic atrophy. The left eye was excised at Boulogne two days after he was wounded. There are two pieces of metal present—one far back in the right orbit and the other in the posterior wall of the sphenoidal sinus in the middle line.

(3) H. S., wounded April 13, 1918, at Neuve Eglise by a shell, a piece of which entered the inner corner of the left orbit, passing directly backwards and coming to rest in the sphenoidal sinus. The wound discharged freely for a fortnight, and he ran a temperature varying between 100° F. and 102° F., then the condition quieted down, and he recovered sufficiently to be sent to St. Dunstan's in July, 1918.

(6) The third case is that of a unilateral injury from a shell, fragments of which struck him on the right side of his face and one large piece penetrated as far as the anterior wall of the sphenoid on the right of the middle line. This man is in regular work, and has been for over a year.

FRONTAL CASES.

Of the thirteen frontal cases the fact that the anterior wall was generally comminuted allowed drainage to take place externally. This resulted in the formation of sinuses which usually required operative interference to close them and to effect intranasal drainage. When the sinus is discharging externally, no nasal symptoms are complained of, but when intranasal communication has been re-established a nasal discharge is usually present for a time. Where the eye was not destroyed the injury produced a rupture of the choroid in five cases, and an atrophy of the nerve in three. In three cases both eyes were destroyed.

(18) F. Y. Wounded in France, March 26, 1918, by a bomb, fragments of which struck him on the right temple, damaging the frontal sinus. A large piece of metal was found in the sinus and a passage from this led into a cavity, the limits of which could not be ascertained, but were probably the result of a fracture of the frontal bone, and the probe passed into the soft damaged brain tissue. Optic neuritis was shown to be present in the right eye, and a month later the patient developed signs of intracranial abscess.

An attempt was made to drain this, the *Streptococcus pyogenes longus* being cultivated from the pus, but the patient died two and a half months after being wounded.

(19) E. D. was wounded by a bomb which smashed the right frontal sinus on its inner side and produced a fracture of the left orbit with damage to the left eye and optic nerve. A polypus protruded from the open sinus on the right side of the root of the nose, the sinus being eventually closed by means of an intranasal drainage. Right eye: Vision = L.M.O.; numerous pieces of metal in eye. Left eye: Vision = blind; optic atrophy and rupture of choroid.

ETHMOID.

Almost every "through-and-through" wound passing through the middle of the face must of necessity traverse the ethmoidal cells, and it is surprising how little inconvenience it seems to produce to have had a large piece of shrapnel casing or a bullet traverse your ethmoidal cells from side to side. On the other hand, a large proportion of the thirty-one ethmoidal cases recorded in my list had definite nasal trouble, although the patients themselves very often had made no complaint until a rhinological examination was made. Damage to the upper part of the anterior ethmoid very usually resulted in anosmia; this was only a passing condition in some patients, but was persistent in others. Blood, pus, muco-pus discharging from the nostrils anteriorly or into the throat is frequently recorded, and in some instances there was deflection of the septum. The ocular symptoms in the cases in which the eyes were not destroyed were generally those consequent on rupture of the choroid and retina.

(27) W. M. was wounded at Soissons by a bullet which entered on the left side at the external angular process and passed out above the zygoma 2 in. in front of the right ear. He has anosmia and some nasal obstruction. The left eye was excised, but the right eye escaped complete destruction, though sustaining severe damage to the choroid. Suddenly, about two months after the wound, he developed a detachment of the retina, which was seen and a drawing made by Captain Wallace. Complete rest for twelve days restored the retina to its place, and he retained vision sufficient to see to go about with, when last examined at Christmas.

(46) R. R. was a unilateral case with complete deflection of the vomer, the point of which could be felt under the skin on the inner side of the left orbit. He had nasal discharge in throat and nostrils, and anosmia. The left eye was undamaged and showed no neuritis at any time.

(43) T. W. N. was wounded in France, April 19, 1918, by a bullet which traversed the face from the left side in front of the ear and came out through

the right orbit. The bullet passed behind the left globe, severing the optic nerve and tearing the retina and choroid from the disk. The temporal bone was fractured, the crack sloping downwards and forwards towards the base. Yet in spite of this wound his smell was good and he had no nasal symptoms at all.

(26) W. T. M. was wounded by shrapnel casing, a piece of which struck the right temple, traversed the right orbit, and remained lodged at the apex of the left orbit behind the left eye. It was at first decided to leave it alone, as the right eye had been destroyed, but afterwards at St. Dunstan's the patient had recurrent attacks of proptosis, and I then decided to do a Krönlein's operation and succeeded in removing the piece of metal. It was firmly fixed in the orbital plate of the great wing of the sphenoid. He can see colours and large moving objects with the left eye, and has a large mass of organized blood covering over the optic disk.

MAXILLARY.

There are twenty-four cases of injury to the maxillary antrum, and it is quite clear that a bullet can traverse both antra without producing any damage to the eyes. In one case the upper jaw was entirely cut in two so that the dental process was separated from the antrum of Highmore and rested on the lower jaw, the patient being unable to raise his upper teeth. Mr. Wynne Rouw used an ingenious device, supporting his upper jaw by a bone knitting needle placed horizontally, and by a net placed over the head which kept the dental process in position; the injury healed well. This patient had $\frac{6}{6}$ vision in each eye, notwithstanding the extent of the damage to his face. Case (73) is another of the same kind, but optic neuritis was present here.

There appears to me to be in this group a rather large proportion of cases in which damage to the macula is the most marked ocular symptom.

G. A. G. Wounded September 29, 1917, in France by a shell, a portion of which entered below the left eye and came out in the right malar region. The left eye was damaged, irido-dialysis and concussion cataract being noted, together with some corneal scars. The right eye shows ruptures of the choroid at the posterior pole. Eight months later he still had a sinus discharging in the malar region, which communicated with the antrum, and Mr. Mollison took him into Guy's Hospital and drained the antrum intranasally.

B., aged 21. Wounded at La Bassée by a piece of metal which entered below the right eye and came out on the left side of the face, fracturing the lower and outer orbital margin. The left eye was destroyed and the right showed a dense white mass devoid of details. Wisps concealing an artery.

Vessels very tortuous and recurved. There was profuse discharge from the ethmoid into the left orbit and some cellulitis of the face subsequently.

L. V. Wounded at Salonika by a trench mortar bomb, which fractured his upper jaw and the right maxillary antrum and orbital margin below. The lower lid was destroyed. The left eye was uninjured. The right eye has a rupture of the retina and choroid. X-ray shows two or three small pieces of metal in the skin, and Captain Howarth drained the antrum intranasally as there was much pus in the middle meatus and the middle turbinal was œdematous.

(65) I. K. Wounded September 1, 1918, by a bullet which entered on the left side in the malar region and passed transversely across the maxillary antrum to a point just below the malar on the right side. Hæmorrhage from both nostrils. Swelling of middle turbinals, some nasal obstruction later on. The right eye escaped serious damage, vision being equal to $\frac{6}{12}$, but the left eye showed several ruptures of the choroid, one below the disk, reaching nearly to the macula, another on the temporal side, and a third one, the largest, below. At the macula is a well formed hole with wrinkling of the retina. The picture was taken ten days after the infliction of the wound.

LACHRYMAL.

The lachrymal cases proved very intractable, as is so often found when the obstruction is due to definite bony causes. It happened several times that the bridge of the nose was cut clean out leaving the lower two-thirds of the nose isolated on the face : such conditions did not give rise to any obstructive trouble. There was of course more difficulty where the inner canthus had been the site of the entrance wound and the lachrymal bone had been fractured leaving the lid everted by the scar and a damaged globe with still sufficient vision to justify every attempt to preserve it. Excision of the sac was necessary in some instances and West's operation was done in others, but most of my cases were not simple ones but were associated with damage to some of the other sinuses.

I should now like to leave the consideration of the subject from the point of view of injury, and to quote you a few cases of *disease* affecting the eyes and the accessory sinuses, which I think are of sufficient interest to record, because in these we do find some support for the theory that inflammation of the accessory sinuses affects the eyes.

(1) Sergeant L., aged 53, a chef in the A.S.C., noticed the sight in his left eye failing in 1915 and in six months he became quite blind in that eye. There was no inflammation but some aching pain in and around the eye. Eighteen months later the right eye began to fail and he noticed pain, coloured haloes, and after a time a rapid failure of vision, which compelled him to give

up his work and seek advice. In May, 1918, a swelling on the right side of the face was noticed and diagnosed as due to sphenoidal sinus trouble by someone in France. On examination there was a quantity of free pus in both nostrils and definite sphenoidal suppuration on both right and left sides. The temperature varied during a period of ten days between 98·8° and 100·6° F. Treatment by nasal irrigation was carried out. In June, 1918, he was admitted into the Second London General Hospital. Right eye: vision $\frac{6}{24}$; tension + 1; field of vision restricted; optic disk cupped; retinal hæmorrhages; tension came down under eserine. The left eye was blind; optic disks deeply cupped; tension + 1. The nose then did not show any pus in it.

(2) Commander L., aged 48, suffered from glaucoma and was seen by Mr. Rolston, of Plymouth, and Mr. F. G. Thomas, of Swansea, in 1918. The tension was controlled by eserine, but an operation was suggested. Before, however, anything surgical was done he complained of intense pain in his right cheek and after examination and exploration of the antrum it was found that he had an epithelioma of the right antrum, from which he died in February of this year.

What relation was there in these two cases between the glaucoma and the antrum trouble? Was it direct or did it merely happen that these two diseases were associated in one patient?

(3) P. M., aged 35, had failure of sight in the left eye in 1916, and was operated on by Mr. W. M. Mollison for sinus trouble. In the early part of this year he noticed trouble of a similar kind in his right eye. Mr. Mollison found pus in his right antrum. When I examined him after the operation I found a normal right eye and a large relative scotoma for colour in his left eye with $\frac{6}{12}$ vision.

(4) C. W. was sent to Mr. Mollison for a report on his nasal condition because he had a unilateral optic neuritis. His sinuses were explored but nothing found. The anterior end of the left middle turbinal was removed. The patient, however, was quite sure he was better for the operation, remarking that "whereas I saw badly every day before, there are now days on which I can see fairly well." Right eye: Vision normal. Left eye: Vision $\frac{6}{12}$, not improved beyond. Central scotoma for colour.

I have had numerous cases of iritis and cyclitis associated with nasal sinus trouble, but generally the rhinologist is disappointing to the ophthalmic surgeon in the so-called idiopathic cases of iritis.

(1) Gunner T. C., aged 38, had severe irido-cyclitis in both eyes, which proved very intractable, and for which no definite cause could be ascertained, except that he had a chronic middle-ear catarrh with thickened drums resulting from nasal obstruction and chronic pharyngitis.

(2) Lieutenant B., aged 21, a unilateral cyclitis with K.P. No cause could be found save some nasal obstruction on the left side with discharge in

nose and throat. The cyclitis cleared up with treatment of the nasal condition.

(3) Sergeant M. Failure of vision in right eye, with iritis, vitreous opacities and optic neuritis. All Wassermann tests negative ; he had chronic laryngitis, but no evidence of definite sinus disease.

(4) Driver F. F. History of tonsillitis and colds. Muco-pus in nasopharynx without evidence of definite sinus trouble. Mouth very septic. He had iritis in both eyes, for which no definite cause could be obtained except the mouth and nose.

In these cases we have a chronic septic process in the nose and throat, and an absence of other cause to explain the ocular trouble. It is a matter for discussion as to how far we may attribute the two conditions to a cause and effect.

Instances of sinus suppuration in young children, discharging into the orbit producing orbital cellulitis, proptosis, &c., are not infrequent, and the records of most hospitals can show numerous cases of this sort.

Recently Mr. Mollison and I had a case of septic dermatitis of the nose leading on to a sphenoidal sinus thrombosis, and death ; an attempt was made to arrest the fatal issue by draining the sphenoidal sinuses through a wide opening into the nose and inner side of the orbits. It was not ultimately successful, but the patient certainly seemed for a few days to be much better for the operation, and it is, I think, worth while pursuing this line of treatment in these otherwise fatal cases.

The optic neuritis, in which an inflammatory condition of the sinuses is supposed to be the ætiological factor, is characterized in my experience by being of a congestive kind with dilated veins and often some ensheathing along the sides of the vessels. There is never great swelling and seldom any exudative patches or hæmorrhages in the surrounding retina. The optic nerve is not in direct communication with any of the accessory sinuses, with the exception sometimes of the sphenoidal sinus, and any influence exerted by an inflamed sinus on the nerve or globe must be indirect, by means of veins or lymphatics, as the evidence of direct influence is entirely absent. An exudation into the sheath of the optic nerve probably produces those conditions of temporary blindness which have been recorded as not infrequent in these cases ; but where the clinical evidence denotes the inflamed sinus as the ætiological factor it is usually the congestive type of neuritis that is present. With regard to glaucoma it is possible to suggest tentative explanations in individual cases, but I cannot think of any theory that would embrace a general explanation. In two cases of glaucoma occurring in soldiers, I found small hæmorrhages in the retina, but one only of these cases had any nasal symptoms; the other had none, as far as could be ascertained.

In conclusion, it seems to me probable that an inflammatory process of a particular sort occurring in the ears, mouth, throat or nasal sinuses can produce definite effect upon the eye. This discussion is confined to the nasal sinuses, but in thinking over the subject I doubt if we are wise in limiting our thoughts and ideas to the nasal sinuses, as probably the pathological process is the same which connects the mouth, throat, ears and accessory sinuses with the eye, and that the communication is made by way of the lymphatic or vascular systems.

The evidence of direct influence, however, is very rare, and as you will have seen, it is entirely negative when viewed from my cases of warfare injuries.

Mr. E. D. D. Davis, F.R.C.S.

I propose to give a brief description of those cases of injury to the orbit and nose which were under my care at a casualty clearing station which was one of the centres for injuries of the head in France.

The majority of the penetrating or severe injuries in this region were fatal, and it was always found at the post-mortem examinations that there were extensive fractures of the anterior fossa of the skull, particularly the roofs of the orbits and nose. In fact, I was struck with the frequent occurrence of a fissure fracture of the roof or roofs of the orbits at post-mortem examinations on cases of bullet wounds in any region of the skull. The fracture of the anterior fossa was accompanied by an extensive and diffuse intradural hæmorrhage, which crept up on to the cortex of the frontal lobes and was the cause of death in those cases which succumbed within the first twenty-four hours. If they survive this period, infection from the nasal cavities results in a basal meningitis, and death supervenes in a period of from three to six days. This infection from the nose is another factor which makes the injuries in this region so fatal, and whenever the dura is penetrated through a nasal sinus the prognosis is always serious and, with a few exceptions, a septic meningitis arises. In addition, the fragment of shell or bullet generally lodges in an inaccessible region of the brain.

Professor Harvey Cushing, in his paper "A Study of a Series of Wounds involving the Brain," records eight cases of this type which he calls the cranio-cerebro-nasal type ; only three patients recovered, and one of the three died of status epilepticus twelve months later.

My own cases of this type numbered twelve, in three of which the patients recovered.

(1) Specimen of frontal wound.

(2) Specimen of frontal wound.

There is another ghastly wound nearly always fatal which should be mentioned—namely, the "through-and-through" wound of both orbits and nose. The eyeballs are pulped, the eyelids torn, and the whole appearance gives the impression that the eyes have been gouged out. I saw four of these cases ; all of the patients died shortly after admission.

(3) Specimen of through-and-through wound.

Fortunately the cases with less severe injuries to the sinuses in which there was no penetration of the dura all did well. The walls of the frontal sinus were frequently comminuted, the posterior wall formed a depressed fracture which on removal exposed the dura. The eyeball was frequently ruptured, and enucleation was obviously necessary. If the anterior portion of the ethmoid was intact and the fronto-nasal duct uninjured, drainage of the sinus was established into the nose by this channel, which is the best method of efficient drainage.

In the more difficult cases, the bridge of the nose with the fronto-nasal duct were blown away, and then it was more urgent to attempt to obliterate the sinus or to establish some connexion with the nose for drainage. Obliteration of the frontal sinus does not give a satisfactory result in every case, and drainage into the nose is to be preferred.

(4) Case of frontal sinus injury.

The maxillary antrum and floor of the orbit were frequently damaged. The simple through-and-through rifle bullet wound of the antrum requires no special treatment at a casualty clearing station, and in my experience healed without further trouble. Sometimes a missile enters and pierces the floor of the orbit and projects into the antrum. Of course a foreign body cannot be left in the antrum and must always be removed, and this can easily be done if it is accurately localized, by opening the antrum through the canine fossa. Drainage of the orbit for orbital cellulitis through its floor into the antrum has proved to be a simple and satisfactory procedure, and proved better drainage than by any other route.

When the facial wall of the antrum is badly smashed, or injury to the antrum is extensive, it is imperative to drain the antrum into the nose by removing a portion of the antro-nasal wall and, owing to the full exposure of the interior of the antrum by the wound, this is a simple operation which does not necessitate special instruments.

The ethmoid is usually damaged when the upper part of the nose is blown away, and owing to its fragility a comminuted fracture often involves the roof of the nose and base of the skull, which adds to the gravity of the case. The same may be said of injuries to the sphenoidal sinus.

(5) Specimen of foreign body in sphenoid and of a through-and-through wound of sphenoid.

Finally, there is an interesting type of case in which a wound in the region of the orbit without penetration or injury to the eyeball produces a dilated pupil inactive to light, but has a consensual reaction, and the eye is permanently blind. I do not of course refer to the dilated inactive pupil of a large cortical hæmorrhage, which in my experience is always of grave prognosis even if a decompression operation is done without delay. The blind eye as a result of an injury in its neighbourhood was shown at two post-mortem examinations to be due to a small circumferential hæmorrhage within the sheath of the optic nerve. In a third case with all the clinical evidence of this condition the patient is still alive, but the blindness and dilated pupil remain without improvement more than three months after the injury.

(6) Through-and-through wound of antra.

The steel hat has been of the greatest value in saving life, and has often turned what would have been a fatal wound into a simple one, but in the above type of case something more was required to protect the face. An easily adaptable appliance which the soldier can wear with comfort without diminishing his field of vision and fighting capacity would be a great benefit. Something in this line has already been done by Mr. Cruise, but further development and distribution are needed.

When the cases described above arrive at the casualty clearing station many are suffering from shock of varying degree, but still more require rest and sleep. A hypodermic injection of $\frac{1}{4}$ gr. morphia, and $\frac{1}{100}$ gr. atropine is given, and a few hours later they are X-rayed and sent to the operating theatre. Here the torn edges of the wound and deeper structures are excised as far as possible, and the wound thoroughly cleaned, loose fragments of bone are removed, and the affected sinuses drained into the nose. If the foreign body is accessible it is removed along its track of entry.

If the patient is operated on within twelve hours of being wounded the soft tissues are loosely stitched and the damage repaired, and when this is done within the twelve hours and before any inflammatory reaction occurs healing is satisfactory and rapid. If the wound is closed after inflammation has begun the stitches will cut out, but even then hæmorrhage has been controlled, the amount of sloughing reduced, and deformity diminished, though such a good result must not be expected. No dressing is required, in fact the patient is much better without it, and only needs a gauze mask to hide his injury from other patients.

I cannot too strongly emphasize the importance of early suture; and surely it seems more rational to make some attempt to keep the fragments of the face in position than to send the patient down to the base with flaps of cheek and tissue hanging down which become œdematous and slough, with fragments of bone imbedded in soft structures and this suppurating mass covered up with a copious dressing which becomes soiled within a short time of application and adds to the victim's misery. I am convinced that the early treatment and suture of these cases before the inflammatory reaction sets in saves life and prevents a considerable amount of suppuration and deformity and many tedious plastic operations.

When the patient is returned to bed he is kept in a sitting position on a Fowler's bed. This position is essential, as drainage is better, the hæmorrhage and œdema are diminished and the patient is less likely to develop pneumonia. The sitting position can only be satisfactorily obtained by the use of a Fowler's bed, otherwise the patient slips down and becomes huddled up.

SUMMARY.

(1) Gunshot wounds of the sinuses and orbit frequently produce fractures of the base of the skull and in a large number of cases are fatal as a result of intradural hæmorrhage or sepsis.

(2) When the nasal sinuses are injured, efficient drainage into the nose is essential. It would be interesting to know the opinion of surgeons on the drainage of severe orbital cellulitis through the antrum into the nose.

(3) Early primary suture of the wounds is advisable and the sitting position on a Fowler's bed after operation is strongly recommended.

The following is a short précis of the notes of twenty-two cases of loss of sight as a result of retrobulbar or optic neuritis, the patients being sent to me by ophthalmic surgeons for a nasal examination:—

Of these cases four were due to syphilis and the Wassermann reactions were positive. Anti-syphilitic treatment was carried out with variable results. One case of double optic atrophy was of doubtful origin.

Only three cases out of the twenty-two had nasal sinus suppuration or disease, and operative treatment produced a dramatically rapid improvement in the sight. The lesion was unilateral and the cause was suppuration of the posterior ethmoidal and sphenoidal sinuses. The maxillary antrum was also affected in two of the cases, but it must be remembered that the antrum is a cesspool for the sinuses of the nose, and I believe that in those cases in which optic neuritis or retrobulbar neuritis has been recorded as a result of antral suppuration the ethmoidal cells were probably involved and that the disease in this latter region was the real cause of the inflammation of the optic nerve. Suppuration of the antrum of nasal origin is practically always accompanied by suppuration in other sinuses, such as the frontal and ethmoidal. On the other hand, where antral suppuration arises from the teeth this cavity alone is involved, optic neuritis or retrobulbar neuritis has never been recorded nor have I ever seen it in the large number of dental cases which I have had under my care. Moreover, the anatomical position of the antrum makes it difficult to understand how suppuration in that cavity can affect the optic nerve.

When optic neuritis is caused by disease of the nose, the nasal disease is obvious. There is a history of an offensive discharge from the nose of long duration, and the presence of suppuration and polypi is easily seen during an examination. This type of neuritis rapidly progresses to optic atrophy and permanent blindness, and the sooner the nose is treated the better. The improvement in sight after operation in the above cases was permanent, the patients being kept under observation for more than twelve months. The condition of the eye was described by the ophthalmic surgeon as optic neuritis and the fields of vision showed an absolute central scotoma, but there was no tenderness of the globe of the eye on pressure or on movement.

Fourteen of the twenty-two cases were retrobulbar neuritis of rapid onset in women under 40 in whom the nose was perfectly normal, and repeated examinations with exploration of the sphenoidal sinuses and antra yielded a negative result. In three cases the middle turbinals were removed, the sphenoidal and ethmoidal sinuses were opened and found to be normal and there was no improvement in the sight.

In most of the cases X-ray examination, Wassermann reaction, tests of urine and of the nervous system, and searches for tuberculosis were all negative; neither was there any evidence of toxæmia, and though the patients were seen at intervals for more than twelve months no further information as to the ætiology was obtained. Nevertheless the sight improved or became normal.

Bruckner records ten cases of unilateral retrobulbar neuritis in which there was no nasal lesion. Like the cases of nasal origin, the fields showed a central scotoma but contraction of the field was more marked. Central scotoma is produced when the outer layer of fibres of the optic nerve and the more delicate papillo-macular fibres which supply the macular region are affected. It can be produced by extension of inflammation to the bone surrounding the nerve as in nasal disease, while the central fibres of the trunk of the nerve go to the periphery of the retina. The charts of the three nasal cases showed absolute central scotoma, but the other idiopathic retrobulbar cases demonstrated a definite contraction of the field and also a central scotoma. Unfortunately there was not a sufficient number of charts to show that only the outer fibres were affected in the nasal cases and all the fibres of the nerve in the idiopathic cases.

Retrobulbar neuritis appears to resemble some cases of nerve deafness in which no cause can be ascertained, and it would be of great value if some suggestions could be made as to the lines on which the investigations of the ætiology of these cases should be carried out. In my series, four cases showed a slight amount of nerve deafness.

SUMMARY.

(1) Of the twenty-two cases examined, three were due to suppuration of the ethmoid and sphenoid of long duration, and in fourteen cases the nose was absolutely normal and the cause was not determined, whilst four were syphilitic and one of doubtful origin.

(2) In the three nasal cases there was obvious suppuration of ethmoid and sphenoid. Suppuration of the maxillary antrum alone is not accompanied by retrobulbar neuritis.

(3) The charts of the fields of vision, though insufficient in number to be conclusive, suggest that the outer fibres of the optic nerve were affected in cases of nasal origin and that all the fibres of the nerve were involved in the idiopathic retrobulbar neuritis cases.

All the specimens shown belong to the War Museum at the Royal College of Surgeons.

A Shell Wound of both Frontal Sinuses.—Lieutenant N. was wounded in the forehead by a high explosive shell on July 30, 1915. When seen in June, 1916, the right eye had been removed, the bridge of nose blown away, and there was a discharging sinus leading to a piece of shell and a second sinus passed into the left frontal sinus. X-ray photographs are shown and it will be seen that there are numerous fragments of shell embedded in the face, and two large pieces lie immediately in front of the vertebral column, all of which are harmless. There were numerous adhesions within the nose and the ethmoidal regions on both sides were occupied by dense scar tissue. Pieces of shell were removed from the bridge of the nose, the adhesions within the nose divided, and an attempt was made to drain both frontal sinuses into the nose. Later the left frontal sinus was obliterated and the right sinus opened, and at the same time a second unsuccessful attempt was made to drain both frontal sinuses into the nose, but this was found to be impossible. Subsequently the right frontal sinus was obliterated, but there is still a small discharging sinus. This case illustrates the difficulty of treating suppuration of the frontal sinus when drainage into the nose is impossible.

Mr. H. D. Gillies.

Discussing Mr. Davis's paper, and in reference to early suture of wounds, it seems to me that in trying to do early suture of wounds you are, in effect, attempting to stamp out a plague of rats by filling up the external holes of the rats with earth, without attempting to destroy the rats themselves. In the case of a honeycomb such as the sinuses present, you cannot excise the whole wound, and by performing early suture you are laying up trouble for the later stages in the treatment of the case. My point lies in the contrast between excision of a wound in the fleshy part, as compared with excision of a wound in the sinus region: excision of a wound in a fleshy region is a possible and indeed absolutely justifiable procedure, whereas in the sinus region I do not think it is possible. In my experience the results of early suture in sinus cases have been bad on the whole. I speak of the results as I see them when the cases reach me. In the next great war the early treatment should be more directed towards keeping the entrance wound and the exit wound as much open as possible so that efficient drainage may be carried out, both from the external and the intranasal aspects. A case that has a large wound of entry over the antrum, as a simple type, should have that exit wound kept fully open in my opinion. To achieve this the skin should be sewn to mucous membrane when the cheek has probably half fallen down. The skin of the outside should be sewn to the mucous membrane of the antrum, so that the whole seat of the injury may be preserved for a full view until there is no suppuration remaining in it. The plastic repair after such conservative treatment is very easy, and although you apparently leave the patient in a deformed condition for three or four weeks, the subsequent repair, without danger from sepsis, is easy.

I do not hold with the idea that the intermediate stage of the deformity is a bad thing; in fact, from the plastic point of view, it is favourable so long as the skin is preserved by suturing it to a neighbouring blood supply—to the mucous membrane of the lip in cases of lip repair, to the mucous membrane of the nose in injury to the antrum, and in the case of the eye to the conjunctiva. If, on the other hand the skin is unduly stretched over the cavity resulting from the missing portion, you either create a deformity which is difficult to repair later, or you close over the hole which is, more or less, a cesspool, the treatment of which will require a great deal of very difficult operative procedure.

With regard to war injuries of sinuses in general, I think the external routes are on the whole indicated. In the case of the frontal sinus region, there should be no hesitation in turning up and keeping open any flap which will give the surgeon a full view of the whole sinus. The repair of deformities in the frontal sinus region is so easy that there should be no hesitation in keeping it in full view until there is no longer any question of suppuration in it.

This meeting is very valuable in bringing the question of co-operation again fully to the fore. There can be no question that the co-operation of dental surgery and—if one may so speak of it—plastic surgery has been of enormous value: there has not yet been enough co-operation between the ophthalmic surgeon and the plastic surgeon. Mr. Davis's point about the position of these patients is a very good one. My own experience has been much more in the direction of repairing deformities, so that I have but little to say about the diseases in the regions concerned.

Mr. D. Leighton Davies.

Broadly speaking the ophthalmic surgeon may take cognizance of nasal sinus diseases from two somewhat different standpoints: (*a*) The inflammatory affections of the orbit and eye produced by sinus diseases, and (*b*) the ocular symptoms which such diseases may produce.

I do not intend dealing with the first group at any great length, but I would like to draw your attention to a few points. In the first place I would note in passing how infrequently we see acute inflammatory affections of the eye or orbit resulting from sinusitis, if we exclude empyema of the frontal sinus which is so apt to give rise to orbital abscess. Time will not permit my running over the gamut of conditions that theoretically may and do occur in the orbit and eye as a result of sinus disease, but I would like to refer to the uveal tract. We are all painfully aware of the seemingly impenetrable barrier that rises before us when trying to elucidate the pathogenesis of many cases of irido-cyclitis and choroiditis. I think that the possibilities of the existence of a latent chronic nasal sinus infection should be constantly borne in mind in dealing with irido-cyclitis and choroiditis. The following case illustrates this point:—

Miss A. H., aged 36, had been a nurse at a London hospital, but had been obliged to give up work eleven years previously on account of irido-cyclitis, and at that time had been advised to have an operation for the relief of a suppurative frontal sinusitis which she refused. From 1901 to 1916 she was constantly under someone's care for recurring attacks which in 1916 had reduced her vision to right, $\frac{6}{60}$, left, $\frac{6}{36}$. In February of that year she underwent an operation for cure of a pansinusitis, mainly however of the right side. By October, 1916, right vision was $\frac{6}{36}$, left $\frac{6}{36}$, and she had had no recurrences. I next saw her in May, 1917, and learnt that during the interval she had been living under canvas as an orderly in a camp in North Wales and was very much exposed. She had had no recurrences, and right vision was $\frac{6}{18}$, left $\frac{6}{12}$ (1). She remained well until April, 1918, when she had a slight recurrence in one eye.

I will now pass on to the second method of studying these cases—viz., the ocular symptoms which may be produced by inflammatory affections of the nasal accessory sinuses. These symptoms may be acute in their onset and affect the sight or the muscular equilibrium of the eye, so that we may meet with sudden loss of sight complete or partial, or, in other cases, sudden diplopia. In my experience sudden loss of sight is very rare, for I have only met with one such case in the past fifteen years. In that case there had been pain for three or four days behind the eye before blindness set in. On the day this occurred there was blurring of sight and sensation of showers of golden light before the eye until sight became completely lost. The next day when I saw him he had no perception of light, the optic disk was red, and the veins full. The sphenoidal and ethmoidal sinuses were promptly opened up and he recovered good vision.

More usually the symptoms are of a subacute or chronic type and we may classify them under four headings: (1) Disturbance of vision; (2) disturbance of accommodation; (3) disturbance of visual fields; (4) disturbance of ocular movements. I do not propose to deal with the latter as I have not made any special investigation on the point, but it is probable that many heterophorias may have their pathogenesis in the nasal accessory sinuses.

(1) Disturbances of vision are in my experience rarely very severe. They are usually described as a blurring of objects after gazing at them for a short time. This may not be progressive, but in the severer forms it is, and when progressive it is generally found that the optic disk shows some departure from the normal in the form of hyperæmia with blurring of the outline—suggesting an early optic neuritis. It may be noted here that alterations in the appearance of the optic disks are very uncommon in my experience. This progressive type is illustrated by the case of :—

W. J. W., aged 37, a postman, who complained of giddiness and blurring of sight. Vision: Right, $\frac{6}{12}$, left, $\frac{6}{9}$; with difficulty he read J2. There was no refractive error. Fundi normal. He had had a nasal discharge for some time. The report of examination of the nose stated that the sinuses were normal. In spite of all forms of treatment sight gradually failed until six months later; vision: right, $<\frac{6}{60}$, left, $\frac{6}{12}$. I then requested exploratory examination of the sinuses, and cultures from the sphenoidal sinuses yielded growths of *Staphylococcus albus*. He thereupon underwent a radical operation, and one month afterwards, vision: right, $\frac{6}{24}$, left, $\frac{6}{9}$; and improvement continued until, vision: right, $\frac{6}{12}$, left, $\frac{6}{6}$, and no blurring on reading.

(2) Disturbances of accommodation are fairly common and may occur with or without loss of visual acuity. I think on the whole it is more frequently found in young subjects. It is shown by rapid tiring of eyes and blurring of print when reading is undertaken. At first the range of accommodation may be normal, but the near point rapidly recedes. I have seen these cases improve remarkably after operation. I consider that in young adults where there is no error of refraction and no heterophoria and complaint is made of difficulty in maintaining

reading for any length of time the nasal sinuses should be carefully examined.

(3) I now come to the subject of the visual fields. I have never yet seen a patient who has complained of disturbance in the visual field; so that this must be regarded as an objective symptom and looked for in most cases. I believe that a preponderating number of cases of nasal sinus suppuration will show changes in the visual fields. These changes may be (*a*) peripheral, or (*b*) changes within the central area of the visual field, that is to say, enlargement of the blind spot or scotomata of various types may be present. The latter changes are not by any means always present. Scotomata I have found generally only in those cases in which the vision is definitely impaired. The scotomata are more often relative than absolute, that for red and green being the largest. They lie within 20° of the fixation point. Enlargement of the blind spot is much more frequent but does not often attain very great dimensions. I look upon the enlargement of the blind spot as an important indication of sinus disease; the enlargement may be in any direction and generally diminishes after operation, often becoming larger again if relapse of the nasal trouble occurs. The most constant change in the visual field is contraction. I would almost go to the extent of saying that this contraction is a constant symptom of nasal sinusitis. The contraction is a concentric one and shows nothing very characteristic except that the extent of the contraction of the colour fields is generally greater proportionally to the white. It may attain the most extreme degree. I have many charts showing a field limited to 20° and less. Indeed I have been sometimes so startled by the degree of contraction present that I have doubted the accuracy of my observation, but they have worked out within 5° whether advancing the white spot from within out or from without in, and the extent has been the same whether taken at 350 mm. or at 1 metre on a Bjerrum screen. I have also compared it with the field as marked out by a finger moving along the arc of the perimeter and found only comparatively slight differences. Yet these people never complain of difficulty in orientation. As in practically all types of defects in the visual field, inversion of the colour fields sometimes occurs. Once or twice I have met with a visual field in which at one or two points the blue has been recognized farther out than the white, but I am not satisfied that the patient was quite accurate in the statement made.

Prognosis.—The visual fields tend to become smaller and smaller until the sinuses have been laid open and drained. After operation if the trouble is of recent origin the visual fields may recover to the full, but if the fields are distinctly contracted and the sinus trouble of long duration, though the fields may show slight increase they never regain their full size and very often do not improve at all. I do not believe that cases of extreme contraction of visual fields associated with good central vision are ever likely to become blind unless an acute retrobulbar neuritis supervenes, a condition which seems to be rare. But where an extremely contracted visual field is associated with loss of visual acuity I regard the outlook as serious.

Pathology.—What is the nature of the lesion which produces these changes in the visual field? In the first place there can be no doubt that the various changes in the visual fields are due to different pathological causes and no single theory will fit all types of cases. A retrobulbar neuritis has been held to occur, but we are up against this difficulty that we can never get a pathological examination of the optic nerve in these cases and therefore its presence can only be deduced by the symptoms present in the visual field, such as enlargement of the blind spot and central or paracentral scotomata of various types, and also by the fact that the intraocular part of the optic nerve has been found in the condition of a papillitis; I think therefore a retrobulbar neuritis is a valid explanation of some of these cases. But I do not think that this will be sufficient to explain the large number of cases in which we find only marked contraction of the visual field. Why is it that these cases are almost always bilateral? I believe the explanation lies in the fact that we are dealing with a toxæmic condition, the toxic element being carried by the blood-stream. The toxins may pass into the blood-stream direct from the mucous membrane of the sinuses, which as you know is abundantly supplied with venous channels. But more than this, the discharge which is so common a symptom in a sinusitis is in large part taken into the stomach from whence the toxins may gain the blood-stream, unless they may have been destroyed by the gastric secretions. There are thus two possible ways in which the toxæmia may reach the eye and there exhibit its injurious action. If this is true it ought to be possible to find contraction of the visual fields in cases of chronic suppuration in areas other than the nasal tract. With this object in view I have been examining cases of suppuration, but have not yet been able to collect a sufficient number to afford proof of the truth or fallacy of my proposition. However so far as I have gone I have been able to find definite contraction of visual field in cases of suppurative conditions remote from the nasal cavities, for example:—

(1) A case of chronic suppurative osteomyelitis in a young woman now convalescent. In her case the visual fields in both eyes were contracted within 30°.

(2) A case of chronic otorrhœa (left ear) in a man aged 46. The fields were contracted on right side within 40°, and on the left side to a less extent.

(3) A case of chronic suppurative osteomyelitis of the right humerus in a young man. The visual fields were contracted on the temporal sides lying just on to 60° circle.

(The meeting was adjourned to April the 10th.)

Sections of Ophthalmology and Laryngology.

COMBINED MEETING.

Dr. James Donelan, President of the Section of Laryngology, in the Chair.

DISCUSSION ON INJURIES AND INFLAMMATORY DISEASES AFFECTING THE ORBIT AND ACCESSORY SINUSES.[1]

Mr. W. M. Mollison.

(I). Cases of Injury and Inflammation of the Sinuses Resulting from Wounds.

My cases are all men from St. Dunstan's, and the majority of them have been referred to me by Major Ormond, who has already dealt with several of them from the ophthalmological aspect. All the cases have been seen some long time—often months—after the injury; most of them had been operated on at least once, many two or three times for cleaning or repair of the original wound. As far as could be gathered none had been through the hands of a rhinologist, and one cannot help thinking that much time could have been saved and much pain spared the men had a rhinologist and an ophthalmic surgeon worked together in the early stages of the treatment.

One other fact emerges from a study of the cases: that it is essential to provide efficient drainage into the nose of the sinuses affected before attempting repair of the socket or the lids. In one or two cases very painstaking and elegant plastic work had to be entirely undone because suppuration in a frontal sinus or fronto-ethmoidal cell had been untreated, with the result that a sinus discharging pus persisted.

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[1] At a meeting of the Joint Sections, held April 10, 1919.

When I began putting these notes together I thought it might be possible to make an orderly grouping of the cases according to the type of wound, but I had to abandon this, and was driven to form two classes only: (*a*) Clean through-and-through bullet wounds, (*b*) all others whether through-and-through obliquely, direct injury, or a combination of these, caused either by bullet or shell.

(*a*) These wounds result in adhesions between the septum and the outer wall of the nose—generally the ethmoid; as a sequel to the obstruction infection of sinuses may occur. In one case division of adhesions to restore some nasal air-way opened a path for infection of the meninges; three weeks after the operation the officer suddenly developed meningitis and died in three days.

I may mention one interesting result of these through-and-through wounds, that is loss of smell and parosmia without any adhesions or infection of sinuses. It is due, I take it, to damage of the olfactory nerve, or bulb.

(*b*) Other wounds; all these had one point in common, they were septic. The orbital walls were fractured to a greater or less degree in all, and one may well consider them from this standpoint. In order of frequency: (1) The roof; (2) the inner wall (in most cases both (1) and (2) involved); (3) the floor; (4) the outer wall.

(1) and (2) The frontal sinus was often opened by the wound; either pieces of metal or pieces of cloth were driven in, as in one of the cases in which a large wad of khaki (probably cap) was found in the ethmoid months after the wound. Fracture of the roof in one case led to frontal cerebral abscess.

(3) In a few cases the floor only has been pierced; this results in a sinus leading to the antrum, discharging pus into the socket. Intranasal operation gives excellent results.

(4) Naturally fracture of the outer wall alone does not implicate any sinus: in one of the cases however a piece of shell opened the left frontal sinus and passed outwards through the outer orbital wall and lodged near the left coronoid process. The frontal sinus was operated upon and the metal extracted through the hole in the outer orbital wall, and a good result followed.

Among the blinded men, as might be expected, the frontal sinus and ethmoid were more frequently affected than the antra; generally the case presented as a sinus about the inner canthus; this sinus had often persisted many weeks. These cases were often those upon which much time and energy had been expended in the way of lid-repair.

In several cases the disease flared up, and acute frontal sinusitis developed, sometimes with pus superficial to the bone. Operations on these cases were often difficult on account of the very dense fibrous tissue in the region of the ethmoid, with binding down of the orbital tissues to the bone—itself often damaged—thus making the anatomical landmarks obscure. In some cases the deep wall of the sinus had been fractured and the dura mater exposed. In one such case the dura mater was torn at an operation done to remove small pieces of metal from the posterior wall of the frontal sinus and cerebro-spinal fluid escaped; pure carbolic acid was applied and recovery was uneventful. X-ray examination has been a help in deciding on the extent of the disease; in three cases it shows pieces of metal embedded in the sinuses.

(II) INFLAMMATORY DISEASES OF THE ORBITS AND SINUSES.

Cases of orbital cellulitis are almost invariably due to suppuration in the sinuses, usually frontal or ethmoidal sinuses: it may be due to suppuration in the antrum, though this is rare. In children osteomyelitis of the maxilla or frontal bone causes the infection of the orbital tissues. I say "almost" invariably because I have seen one case that proved at post-mortem examination to show no sinus infection; the patient had a typical orbital cellulitis; operation showed no infection of frontal and ethmoidal cells. The patient died and post-mortem examination showed advanced infective endocarditis and pyæmic abscesses in almost every organ in the body, but no sinus suppuration.

I have seen a number of cases of retrobulbar neuritis referred for examination of the sinuses, but in no case have I been able to find pus in the sinuses. Conversely cases of suppuration in the sphenoidal sinuses have shown no eye symptoms.

Mr. J. F. O'MALLEY.

I do not propose to enumerate a whole series of cases. I have notes of about sixty, which take in the nasal accessory sinuses, and also involve eye lesions and lesions of the lachrymal apparatus. That matter I propose to deal with in greater detail at a meeting of our own Section of Laryngology.

To-day my remarks will deal with some practical points in treatment. In wounds of the ethmoid cells I have found that where there was previous evidence of obstruction, sepsis was invariably found, and it was necessary to deal very freely with the condition present, and bring about thorough drainage. But I was also struck by the fact that in a very large percentage of my ethmoidal wounds there was practically no sepsis at all, and that they did not require any extensive treatment, that is, not further than to remove adhesions which were present in the nose so as to bring about free ventilation.

In the case of gunshot wounds, I was struck by the great facility in healing when once a free air-way had been set up and one had got rid of whatever sepsis might be present, in contrast with disease of the ethmoidal region in ordinary inflammatory conditions of the nose. I can make the same remark concerning antral lesions. The gunshot wound cases healed much more readily and rapidly when one had to operate for sepsis than when it was an ordinary inflammatory condition. Out of fifty gunshot wounds of the antra, I had to operate on only fourteen for sepsis, and that sepsis at the beginning was manifest in eleven inasmuch as there were open wounds into the sinuses, in the other three it was revealed by puncture. In eleven other cases I had to operate in order to remove foreign bodies, five of which were septic. In the remaining twenty-eight the X-rays showed considerable opacity, and in many cases the report stated there was effusion, though on puncturing the antra in these twenty-eight, nothing was found except in the three mentioned above. So many of these through-and-through wound cases did not require to have the antra opened into the nose for the purpose of drainage, because there was no sepsis. The difference between my cases and Mr. Hett's may have been due to the fact that his were so much more severe. Mine were cases in which bullet or shrapnel passed clean through, merely damaging the sinus and causing some hæmorrhage, and that hæmorrhage was responsible for the opacity revealed by the skiagram. I had eighteen cases in which the eye was involved. In ten of them the eye was lost, and in the remaining eight the injury was of varying degree. In my experience the loss or injury of an eye was invariably due to direct injury. That is to say, in half these cases the eye was damaged by the primary wound, and in the cases in which the eye was not lost, the injury was due to the transmission of the force to the bony wall of the orbit, and it was due to the missile striking the malar bone. Missiles passing through the anterior wall of the antra seemed to have produced no damage to the eye in any cases I had under my care.

I have had twelve cases in which the lachrymal apparatus was involved; in each of these there was suppuration. And my experience in this respect has been, that where an injury took place below the level of the lachrymal sac, thus cutting off the tear duct, there is suppuration in the sac above. And the treatment was much more satisfactory in cases of that type than in those in which the sac was directly injured: by short-circuiting the sac into the nose the result was satisfactory. In cases, however, in which the damage to the sac involved broken bone the results were far less satisfactory. Where it was extensively destroyed, as in some of Mr. Hett's cases, one had not to deal with the sac at all; one closed the wound in, as far as possible, and there would be some overflow of tears from the sac if the eye were lost, or if the eye remained there would be epiphora. There is an interesting group of cases of epiphora in which, under ordinary circumstances, there is not much trouble, but when the patient is out in the wind, playing games or motoring, the tears overflow and are a cause of inconvenience. I think these cases are due to hypertrophy of the inferior turbinate, that when the patient is exposed to winds the turbinate gets engorged and presses on the lower end of the tear duct, and the duct is unable to carry off the extra tears produced by the irritation of the wind. The treatment for such a case is not the cautery, as some recommend, but removal of a certain amount of soft tissue from the lower border of the inferior turbinate, so that when that is exposed to climatic influence, it will not get engorged and exert pressure upon the tear duct.

Mr. G. H. Pooley (Sheffield).

Referring to some points which have not been mentioned by those who opened this discussion:—

(1) Among the inflammatory conditions, orbital cellulitis is frequently due to an extension of inflammatory trouble from the superior ethmoidal or lachrymo-ethmoidal cells. In the latter case there is frequently a localized abscess in the orbit, closely resembling an acute dacryocystitis. In children orbital cellulitis is often due to a patch of osteomyelitis in the ethmoid or frontal region; other patches are found elsewhere, for instance, on the hard palate. These cases frequently die. The best treatment for them is free incision, and the free use of a sharp spoon.

(2) New growths. Sarcomata commencing in the ethmoid or maxilla may invade the orbit. In one case I removed the whole bony orbit, except for the base of the skull, the upper jaw having been removed by my colleague, Mr. Kerr. The patient recovered and lived for some

time, but I have lost sight of the case. Ivory exostoses of the frontal bone are hard to diagnose; they can be removed with a chisel, but require time and patience—while the large and less dense osteomata of the ethmoidal region have very small pedicles, and are more easily dealt with, particularly if the outer wall of the orbit is turned outwards as an osteoplastic flap, so that the eye can be displaced outwards.

Of gunshot wounds of the orbit, I have seen a great many in the later stages. A great deal can be done to relieve the grosser deformities by the use of skin flaps and the implantation of cartilage and fat. The more one tries, the more one finds one can do, and there are but few cases in which something cannot be done.

In reference to defective vision due to nasal conditions, my experience is that this is due either to pressure on the optic nerve, or to toxic influence on the retinal cells. There are three classes of cases :—

The first class, due to pressure only, is well illustrated by one of the two cases of distension of the maxillary antrum causing pressure on the optic nerve at the optic foramen, published by Mr. G. Wilkinson and myself. In this case, which is published in the *Ophthalmic Review,* xxxii, p. 130, complete and total loss of sight, even of perception of light, took place suddenly. There was no optic neuritis to be seen, and recovery was complete, after the relief of the condition by operation. I saw this patient five years later for another condition, and the good result had been maintained. She saw $\frac{6}{5}$, and had a full field of vision.

In the second class, there is some pressure on the optic nerve, and some extension of inflammatory changes to it, probably where the optic nerve is embedded in the sphenoid. In these cases there is definite optic neuritis, but removal of the inflammatory focus in the nose relieves the condition. If this is not done soon enough some optic atrophy takes place.

In the third class of cases, the condition is exactly similar to the other toxic amblyopias, such as those due to tobacco, &c., although the condition is a grosser one and causes optic atrophy if not relieved. The toxic material acts on the nerve cells at the macula, and the nose is one of the commonest sites for the manufacture of this toxin, so much so that all cases of this kind should be investigated by a nasal surgeon, who should, if there be any doubt, remove the superior turbinal to ensure free ventilation. After this, I have seen very marked improvement take place. But most of the other mucous membranes, such as that of the large intestine, can also manufacture a toxin which has the same effect.

Mr. E. H. E. Stack (Bristol).

My remarks will be limited to a few only of the many subjects which arise in this discussion.

(1) Restoration of completely obstructed nasal passages after injury. In the first case a piece of shrapnel was buried in the nasal fossæ. The patient was quite unable to breathe through his nose; there was no discharge. I found a way through the left nostril with a probe, and forcibly dilated this with various instruments till there was a good air way which admitted the finger easily. After a good deal of bleeding had abated, I put in a hollow "stent," covered by an Esser graft, which fitted the cavity closely. A month later he had a good passage, about half the original size, nicely healed and looking permanent. In another case the injury had destroyed the orbit and bridge of the nose, and completely blocked breathing. I operated from outside, as I had to turn down the nostrils, which were looking forward, by reposition and a wide skin flap. The posterior part of the left meatus was normal. The anterior ½ in. was a bony mass, which I divided and forcibly separated, and then treated in the same way as in the last case. Three months later he had easy breathing, and was highly satisfied.

(2) I have seen a good many cases of diplopia caused by injury. Two of these were due to interference with the pulley of the superior oblique, after operation on the frontal sinus. One patient was improved by a prism, but I lost sight of her. The other had been wearing a patch for twelve months, and was cured after wearing a weak prism for two months, after which she discarded it. Four years later, after an illness, the diplopia returned, and again disappeared on using the prism for a few weeks. A man from whom I had removed the superior maxilla for sarcoma got a dropped eye and intolerable diplopia; on three occasions I injected paraffin into the tissues below the eye. After the third injection the diplopia disappeared, although the drop in the eye remained as disfiguring as ever. I saw him seven years later with no recurrence of double vision or of the sarcoma.

(3) I have found pasting a piece of paper on one half of the lens in the affected eye a comfort in these cases. I expect members have often used it. For instance, a lady who, after a mastoid operation, had paresis of the external rectus, found this a great comfort; directly the diplopia showed itself she moved her head a little and blotted out the second image, at the same time the weak muscle had a chance at an effort towards fusion.

(4) I hope some member has taken up the subject of causation of inflammatory proptosis. I have seen over a dozen of these cases, mostly fatal, and although there seems to be a tendency to regard the disease as originating in adjoining sinuses, I have seen fatal cases following empyema, appendicitis, and acute necrosis of the leg, and one very severe unilateral case, which recovered, in which the entrance of sepsis was through a neglected whitlow.

Mr. W. Stuart-Low.

I have not held a military appointment, but at the Central London Throat, Nose, and Ear Hospital we have had many cases sent up from Hospitals where they had not a specialist for these diseases.

The first class of cases about which I would like to speak are those with an acute inflammatory condition of the frontal sinus, where the œdema and swelling were coming from the forehead downwards on to the inner canthus. In some cases the eye was closed up when the patient was seen. Most of these cases were sent with a view to operation. A certain proportion of them we sent away without operation, because examination of the nose showed that the middle turbinal was swollen, thus blocking the passage. The middle turbinal was packed around with cotton wool, saturated with cocaine and adrenalin solution, and the patient sent to rest for ten minutes; this packing being removed, in almost every case discharge was discovered coming down from above—the pus escaped from the blocked frontal sinus. After a few hours' fomentation the swelling went down, and in a number of cases the patient got quite well without an operation. That this method of treatment so often results in cure ought to be better known than it is, because it would often prevent the ophthalmic surgeon committing himself as to the necessity of an operation. I do not operate until I have tried suction from these frontal sinuses. I have now been able, after passing a tube into the sinus to suck away the discharge, the tension thus being reduced; the effect has been most marked. When this did not succeed I took the patient in and incised freely under the eyebrow: this should be a free incision in most cases. In some cases it was necessary to open the sinus, but after free incision the pus sometimes escaped through a fistula in the bone. If this does not happen, the bone should be opened. I refrain from washing out the sinus. Washing out in these cases is bad, because the two sinuses often communicate, and there is a great risk of the purulent matter being driven into the other sinus. After operation I make a practice of putting a cage over the sinus in order to obviate bandage pressure on it: this is very effective in preventing subsequent deformity.

The next class of case I have had sent up to hospital, and with which I have had trouble, was that in which the lachrymal apparatus has been involved—cases such as those mentioned by Mr. O'Malley. I have failed to get some of those well, and I gather from Mr. O'Malley's remarks that small pieces of shell casing or shrapnel may have become embedded in the bone, and so prevented the operation from being successful.

Another class of case was that in which there was acute or subacute inflammation of the antrum. The swelling in such instances comes from below and affects the eye from the outside. In these cases there is always periostitis, the inflammation extending from this to the soft structures. Most of those cases were sent up with a request for operation, and nearly all got well if the antrum were well and repeatedly washed out through the nose, for in those antral inflammations and abscesses washing out is always safe—there may be a partition dividing the antrum, but it is a complete one, and there is, therefore, no danger of driving the purulent antral contents farther afield as in the case of the frontal sinus.

Another class of case that has given me trouble comprises those in which the sphenoidal sinus has been involved. There may be acute sinusitis sometimes with severe headache, with pus visibly running down the posterior wall of the nasopharynx. Having removed most of the middle turbinal and the lower part of the anterior wall of the sinus—a safe operation—the sinus was then sucked clear of its purulent contents. Suction in sphenoidal as in frontal sinus abscess is a most beneficial and safe procedure.

The only other cases I wish to mention are those in which shrapnel has become embedded. This is the only objection I take to the remarks of Mr. Davis, who said all shrapnel should be removed. If the foreign body is accessible, I agree it should be removed, but not otherwise. In the case of one of my patients a piece of shrapnel was embedded in the antrum, and in another in the middle turbinal, and both men are happy, not being inconvenienced in any way, and therefore I do not propose to interfere with them at present.

Mr. HERBERT TILLEY.

The slides which I wish to show first may render my subsequent remarks more easy to follow. I particularly wish to emphasize (from the first four slides) that even at three years of age there are well developed ethmoidal and sphenoidal sinuses. At the present time I have, in University College Hospital, a boy, aged 5, who has had orbital cellulitis, with suppuration of the right frontal sinus. (Slides exhibited.)

I can sum up my experience in the matter under discussion in a series of statements:—

(1) The rarity with which a patient mentions eye symptoms when suffering from sinus suppurations: he may deny them when directly questioned on this point.

(2) The infrequency with which I have been able to find nasal lesions in patients who have been referred to me by my ophthalmological colleagues on account of a unilateral retrobulbar neuritis. The only explanation I can offer is that the initial lesion was an infection from the nose, the sinus has drained out and become healthy, and, when the case has been referred to me, nothing but a normal condition in the nose has been seen, although the resulting and progressive lesion is present in the eye.

(3) In the cases which get relief from intranasal treatment, the relief is often very rapid, so that one concludes the effect must be due to pressure, rather than to sepsis. This fact (the rapid relief) makes me feel that early treatment should be carried out in those cases in which an eye lesion coexists with a nasal lesion. I would add one word of caution—viz., that it is unwise for the nasal surgeon to attack an *acute* intranasal infection by radical measures, because, if he does so, he may start an extension of the infection which will be disastrous to the eye, and possibly to the patient's life. In those cases he should be satisfied with providing for the simplest forms of free drainage.

(4) Another point is this: As I have said, one does not often find an explanation of the cases which are referred to us by ophthalmic surgeons, but I have seen iritis, cyclitis, and some internal affections of the eye absolutely cured by intranasal operations. My colleague, Mr. Parsons, will remember a patient who, for years, suffered from recurrent iritis. He came under my care, and I opened the frontal, ethmoid and antral sinuses, and cured the suppuration. My operation precipitated an acute iritis within twenty-four hours of the operation, but that was

the last attack he had and it was four years ago. I saw him three weeks ago, and he says he has almost forgotten his old "iritis days," and he has had no further trouble. That is a case in which intranasal infection produced an eye lesion, and in which the result was a happy one.

(5) With regard to orbital cellulitis, I have never seen a case in which there was not coexistent sinus suppuration. I know it may arise from other causes, but I have never seen such a case.

(6) I showed some slides of the normal sinuses in children because I want to emphasize the possibility of eye lesions in children being due to sinus suppuration.

In conclusion, I hope this will not be the last occasion on which the two Sections will unite in discussing subjects of mutual interest, because although we rhinologists may make "circular tours" of the sinuses, we have no wish, and fewer qualifications, to trespass on the territory of our ophthalmological colleagues; and although when we do make those tours we may sometimes find a pathway from which we can look into their territory, most of us will be quite ready to beat a hasty retreat into our own.

Mr. H. LAWSON WHALE.

As time does not allow of making any connected general remarks or of showing cases, I will utilize the occasion by showing some pictures, as they will serve to emphasize a number of points in the discussion.

Case I.—A piece of shrapnel, as large as half a man's thumb, is seen in this skiagram lying in the pituitary fossa. It was removed through a Moure's infra-orbital incision, and the skiagram is shown to exemplify the usefulness of this route for access to the sellar region, through the sphenoidal sinus.

Case II.—In the case of this man, aged 60, a bullet traversed the palate, antrum, ethmoid, destroyed the left eye, and emerged in the middle of the left temporal fossa. Eventually the eye-socket was neatly covered in by a plastic forehead-flap. The healed sinus in the temporal fossa broke down again as shown in the photograph, and I was asked to see him. This skiagram shows an entire absence of bone in the outer half of the upper orbital margin, and a sequestrum the size of a pen-nib about an inch deep to the glabella. I elevated the plastic flap, removed this sequestrum, cleared polypi from the left antrum and ethmoid and from the right frontal sinus, and removed diseased ethmoidal cells. As regards the left frontal sinus, it was impossible to do a "bridge" operation, as there was no anterior or posterior wall to the sinus: the dura here, bulging and pulsating, was heavily covered with granulation tissue. Drainage was maintained, as seen in this next skiagram, by a rubber tube, and the plastic flap replaced. Recovery and healing were uneventful; and the case is here described to illustrate a point that has already been mentioned, namely, that the existence of an undiscovered sequestrum or septic area may be a fruitful source of suppuration after plastic operations.

Case III.—This skiagram shows a probe passed through a fistula in the upper lid, and lying in the frontal sinus. The case was sent down to the base as an ethmoidal mucocele. The man had been kicked in the eye two months before. I performed a Killian's operation, and found the deepest frontal sinus I have ever seen; it apparently extended to the sphenoidal fissure. There was no bony floor to the sinus, only periosteum; and its contents resembled cream cheese. As regards the pathology, the situation was unlikely for a dermoid cyst. Cholesteatoma was ruled out by the absence, chemically and microscopically, of cholesterin; and negative evidence obtained as regards tubercle. It was probably a sinusitis caseosa following trauma. The last photograph shows the patient, healed, on the day of his discharge from hospital, three weeks after admission.

Case IV.—In this photograph the left infra-orbital region is œdematous, the size of a small apple: this condition was chronic, and followed a gunshot wound of the face with thick scar-tissue resulting. The œdema was finally cured by lymphangioplasty, the silk strand passing deep to the soft tissues, from the middle of the œdematous area to just below the mandible. The cure was tedious, and the silk remained in place several weeks: ultimately the œdema subsided, as is seen in the next photograph. The case is shown to suggest that lymphangioplasty might be tried more often to combat obstinate local œdema.

The CHAIRMAN.

Before asking the openers to reply, I would like to support the view so well expressed by Mr. Tilley, that it is well to bring the two Sections together, and I hope this will not be the only time we shall do so. The papers which have been contributed by the four openers are very valuable, and I am sure they will prove profitable to both sides, for we have learned a good deal about the symptoms associated with sinus disease, ethmoid and antral disease especially. I think we must focus our attention mostly on the ethmoidal cells in regard to the effect produced on the orbit. One outcome of the discussion seems to be to emphasize the old dictum that the sooner we get our ethmoidal cell cavities clear, the less likely are complications to ensue. Another result seems to be the slightness of the effects seen generally in the eye from quite severe sinus disease. I hope when we meet again these points which have emerged from the debate will be further gone into as well as some subjects which have been unavoidably omitted on this occasion.

Mr. L. V. CARGILL (in reply).

When I spoke of sinusitis being "latent" the word "latent" was used in the sense employed in rhinology of being concealed and requiring more than ordinary nasal inspection to definitely determine its presence.

I associate myself with the remarks of Mr. G. Seccombe Hett as to the desirability of obtaining statistics regarding the frequency of the association of retrobulbar neuritis with accessory sinusitis; and also of the proportion of cases of orbital cellulitis due to nasal disease.

Concerning orbital fractures, Mr. E. D. D. Davis spoke in his paper of the frequent finding of a fissure fracture of the roof or roofs of the orbits at post-mortem examinations on cases of bullet wounds in any region of the skull. This is contrary to the conclusion of Lagrange, who maintains that fractures of the cranium by projectiles of war implicating the cranial vault, even when they are accompanied by large losses of substance, do not extend by radiation into the roof of the orbit, and that therefore the sphenoidal fissure and optic foramen and structures passing through them remained unharmed. In this connexion I may refer to Hogarth Pringle's paper in the *British Journal of Surgery*, January, 1917, on 136 post-mortem examinations in cases of fractured skull in civil life. Fracture of the optic foramen was uncommon. In twelve cases hæmorrhage was found in the sheath of the optic nerve, but in none of them was there evidence of direct injury to the optic nerve. In three cases it was certain that the blood had been effused on the orbital side of the optic foramen, and in one case there was no fracture of orbital roof or optic foramen. This proves that in head injuries intravaginal optic nerve hæmorrhage may take place without any fracture of orbit or optic foramen and be simply due to the violence of the blow causing a varying tension in the orbital contents. The hæmorrhage may cause severe nerve compression, and blindness may be due to that or to interference with blood supply. The practical point is that, granted early diagnosis, prompt incision of the sheath of the optic nerve might prevent blindness.

Lagrange lays down the law that a projectile passing across the facial bony structures below the orbits produces macular or paramacular concussion changes. This does not appear to be invariably the case, for both Mr. Ormond and myself have had cases in which both maxillary antra have been traversed without any ocular damage.

Referring to Mr. Tilley's interesting anatomical demonstration, I alluded in my opening paper to the occurrence of orbital cellulitis of ethmoidal origin in early childhood, even as early as eleven months.

Mr. A. W. Ormond (in reply).

As far as I can make out from the remarks which have been made by members of the Section of Laryngology, the trend of opinion is that disease of the sphenoidal sinus and of the posterior ethmoidal cells is the most probable cause of these cases of retrobulbar neuritis which we have been discussing: that antrum, frontal, and anterior ethmoidal sinus disease, probably, is not a causative factor in involvement of the optic nerve. On the other hand, the conclusion seems to be that the maxillary, frontal and anterior ethmoidal sinuses are more commonly the cause of those cases of orbital cellulitis which we find so frequently in children, and of which all of us have seen a good many cases. If that is so, it clears the ground a good deal. One is able to say where you have a central scotoma or optic neuritis, and there is sinus trouble, that the probable cause will be sphenoidal or posterior ethmoidal. If, on the other hand, we are told there is pus in the antra, Mr. E. D. D. Davis suggests that it has drained from the ethmoidal or the sphenoidal sinus. If this can be generally agreed to it means we have taken a long step towards understanding these cases, because it is probable then that the pathology is one of direct extension, and not expressed, as I had previously thought, by something conveyed from a distance by means of blood or lymph.

Mr. E. D. D. Davis (in reply).

There are one or two points which I should like to clear up.

Major Gillies, speaking from his large experience, objected to early suture. I think we should probably agree that you cannot suture a case unless there is efficient drainage into the nose. Such drainage

I regard as absolutely essential. Then I suture by means of interrupted stitches, and if suppuration occurs, a stitch can easily be taken out. But it is very important to preserve the orifices of the face, that is, to preserve the nostrils, the eyelids, and the mouth, and then plastic operations subsequently become easier. If these parts are deformed, subsequent plastic operations are more difficult. I think the primary suture which I advocate stops hæmorrhage and suppuration.

Mr. Stuart-Low said I advocated the removal of all foreign bodies, but in that respect he has misunderstood me. What I said was, that if there is a foreign body in the antrum it must be removed, and I still think a foreign body in a sinus should be removed. I showed the skiagram of a boy who had pieces of shrapnel in the prevertebral muscles of the neck for four years and they had caused him no trouble. In such cases as that it is not necessary to remove the foreign body, but when in a cavity its removal is a necessity.

With respect to the remarks concerning retrobulbar neuritis, the cases which present difficulties are those of young women who have sudden loss of sight and come with a diagnosis of retrobulbar neuritis. It is in these cases I cannot find any nasal lesion.

With regard to removal of middle turbinals, that has been done, but without result. But when you have an obvious nasal case, if you operate and drain the sinuses, the improvement in sight is really dramatic, and in that way the cause of the trouble seems to be proved. A temporary sinusitis has been suggested, and in the cases I had I tried to follow it up. I asked for a history of a cold at the onset of the retrobulbar neuritis, or for any indication that there was a sinusitis, but I was unable to obtain it, only the impression that the public generally are very keen on chills and colds as the cause of anything. Two or three of my patients developed bad colds while under observation, and they told me their sight was better during the cold than at other times: that was a gratuitous remark. Mr. Treacher Collins has suggested that a temporary catarrhal sinusitis, which has disappeared by the time that the patient reaches the rhinologist, may be a cause of the retrobulbar neuritis.

Mr. G. SECCOMBE HETT (in reply).

I trust that this meeting may be the first of many combined meetings of our Sections. We should combine to work out such a problem as the relationship between retrobulbar neuritis and nasal infection. One is struck by the diversity of opinions expressed by the various speakers. Some hold that there is only an occasional relationship between inflammation of the ethmoidal cells and sphenoidal sinus, and retrobulbar neuritis, and others held the opposite view. This diversity of opinion arises from conclusions based upon too small a number of cases by each individual person. If 500 cases of retrobulbar neuritis were worked out and treated by the ophthalmic surgeon and rhinologist in combination, we should soon arrive at more scientific and accurate knowledge on the subject, and this our combined Sections should carry out.

Another point brought out in our discussion is that the rhinologist rarely sees a case of orbital cellulitis without a source of infection from ethmoidal cells or frontal sinus. It would be interesting to find out what proportion of cases are seen by the ophthalmic surgeon in which the nasal accessory sinuses are not the source of infection.

Mr. O'Malley has found that wounds of the antra healed readily, and that infection of the cavity was less severe than in ordinary non-traumatic inflammations of the cavity. My experience has been the reverse. This is probably for two reasons—one that in the ordinary perforating bullet wounds the missile often does its own intranasal drainage by perforating and opening the inner wall of the nose. Our cases of such injuries at the Queen's Hospital, Sidcup, are usually of a more severe type and there is often severe comminution of the maxilla—such cases, in fact, which require plastic treatment later. In these cases the occurrence of chronic suppuration with polypoid degeneration of the lining mucous membrane is very common. Of this type over 100 cases have been operated on in the Ear, Nose, and Throat Department of which I have been in charge ; cases in which the radical operation was necessary for chronic suppuration before plastic repair could be proceeded with.

Forty cases of chronic lachrymal sac suppuration have been treated in the Department by excision by the external route, combined with intranasal drainage, and in most of these cases the sac has been present, and, on pressing over it, mucus or pus could be squeezed through the canaliculi. The sac was only directly injured in a small proportion, but there was frequently a lesion of the nasal processes of the inferior maxilla involving the nasal duct. These cases did very well, and in every case the external wound healed well and left a hardly perceptible scar.

Mention has been made by Captain Stack of hydrocarbon prosthesis for dropped eye. I cannot too strongly emphasize the point that, in the opinion of myself and others who have had the unfortunate experience of removing paraffin for complications resulting from its introduction, this method should not be employed. A costal cartilage graft will make an excellent infra-orbital margin or support for the eye and has none of the risks or disabilities of paraffin.

The method of treating an acute frontal sinus which has been described by Mr. Stuart-Low is one which I think we all adopt. Cocainizing the middle turbinal makes the latter shrink up, and is frequently sufficient to produce efficient drainage and effect cure. It has usually to be repeated for several days. Another advantage is that it often allows the passage of a frontal sinus catheter with withdrawal of the pus or mucus from the cavity. If this fails, removal of the anterior end of the middle turbinal is effected, which gives still freer drainage. If this treatment is carried out early very few acute frontal sinus inflammations will require external operation.

Mr. E. TREACHER COLLINS.

I propose that a Joint Committee should be appointed of the two Sections to investigate the relations between retrobulbar neuritis and sinusitis, and to collect cases.

Mr. HERBERT TILLEY.

I would like to second Mr. Treacher Collins's admirable suggestion. The amount of material bearing on sinus suppuration in the clinics of the London hospitals is enormous, and in six months a few men working at the relationship of such lesions to the eyes could collect a great deal of valuable information.

(This was agreed to.)

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Section of Otology.

President — Mr. HUGH E. JONES.

Acute Osteomyelitis of Right Temporal Bone in a Boy; Operations; Recovery.[1]

By HERBERT TILLEY, F.R.C.S.

THE patient was admitted to University College Hospital for acute suppurative otorrhœa (right) of some six weeks' duration, associated with pain, pyrexia, sleeplessness, and malaise. The mastoid antrum and adjoining cells were explored in the ordinary way, the roofs of the antrum and tympanum were found to have been destroyed by disease, the dura was replaced by a mass of granulation tissue which permitted the tip of the little finger to be passed into the adjacent region of the temporo-sphenoidal lobe. The wound was left wide open and dressings applied. During the following three or four weeks the soft tissues in the temporo-mastoid regions became swollen and œdematous.

At the second operation, the squamous and mastoid portions of the temporal bone were freely exposed and were found to be so softened by inflammation that large portions could be scraped away with "sharp spoon" or removed with forceps. The dura mater was so thickened and unlike the normal structure that it was difficult to recognize it or to differentiate it from surrounding infiltrated tissues. During the subsequent and long convalescence herniæ cerebri made their appearance on three occasions in the original wound over the mastoid, and on each occasion they were removed by division of the stalk which seemed to depend from the brain in the neighbourhood of the defective roofs of the antrum and tympanum.

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[1] At a meeting of the Section, held November 15, 1918.

After a long convalescence the patient is now practically well, except that a small sequestrum appears to be making its way to the external opening of a fistula in the lower part of the post-aural wound. In the experience of the exhibitor acute spreading osteomyelitis of the temporal bone is rare, and he believes that most of the recorded cases have proved fatal. It is possible that the very wide removal of inflamed bone in this case accounts for the successful issue.

DISCUSSION.

Mr. TILLEY: There is still some suppuration in this case, and if you pass a probe through the fistula in the post-aural wound you will find a spicule of bare bone. I felt it there a fortnight ago, and the patient is down for admission to hospital in order to have it removed, after which I do not doubt there will be sound healing. He has a large right tonsil which will be dealt with at the same time.

The PRESIDENT: What interests me most in Mr. Tilley's case is the treatment of the hernia; it seems to have disappeared completely. Hernia has always, in my experience, been the most difficult complication of brain abscess to treat, probably because it is associated with increased intraventricular pressure.

Mr. W. STUART-LOW: During twenty years' experience I have had a few cases like this. The earlier cases gave me trouble, but since I have used a shield in order to avoid pressure on the wound, I have not had trouble. A large shield would cover the whole of even such a large wound, and the bandage and dressings would then be adjusted over the shield. I think the narrowing of the meatus is entirely due to the bandaging. The meatus is unusually narrow, which militates against a good result. This is accentuated by the meatus being pushed forward from behind by the bandage pressure. With the use of a shield, drainage is facilitated and congestion is prevented; moreover the granulations which are often caused by irritation from the dressings are never redundant where the shield has been made use of throughout the after-treatment.

Mr. HUNTER TOD: Osteomyelitis is extraordinarily rare, as Mr. Tilley has said. It is not the result of operation, but of a definite germ infection corresponding with the osteomyelitis sometimes met with in the frontal bone. The patient is usually young. Following middle-ear suppuration, a boggy, œdematous swelling spreads slowly over the temporal and parietal regions, even extending to the eye; but not so much over the mastoid. These patients do not get a very rapid pulse, nor a temperature higher than 101° F. When you operate you find marked periostitis, the whole bone comes away in masses, and, beneath, the dura mater, although much thickened and covered with thick gelatinous-looking granulations, is such a protection that meningitis does not occur. I have had three cases: two proved fatal from sinus thrombosis with secondary meningitis, the other recovered. In the London Hospital Museum there is a calvarium from a patient operated upon some years ago, the disease having spread over the whole of the vault of the skull. The treatment consists in recognizing the condition early, and then removing a large area of bone well beyond the infected area, otherwise osteomyelitis is a progressive and fatal disease.

Dr. PERRY GOLDSMITH: The zygomatic cells have probably been well developed for a child of this age, and the extension has taken place after those cells have been involved. When osteomyelitis of the bone outside the mastoid takes place, the extension occurs from these cells after they have become involved. The case illustrates the necessity of early and very wide operation. If operation is postponed the chances of recovery are lessened.

Dr. D. R. PATERSON: Has Mr. Tilley any explanation to offer as to the difference between the extreme rarity of osteomyelitis of the temporal bone and its more frequent occurrence in the frontal bone, more particularly after operative procedures? The only case of acute osteomyelitis of the temporal bone I have seen occurred secondarily to frontal trouble. A considerable area of both temporal bones was affected. The disease had travelled back from the frontal bones, and I think I removed most of the squamous portions of both temporal bones. The course of the case extended over some fifteen months, during which time there were several operations.

Dr. KELSON: Have Mr. Tilley or Mr. Tod seen a case of this trouble in which there has been definite osteomyelitis *before* operation? In the frontal bone it is very rarely seen until *after* operation. Is this a point of difference between the two? My impression is that in these very rare mastoid cases the mortality is not so high as in the frontal cases. Do others share that opinion?

Mr. MOLLISON: In reference to what Dr. Kelson has just said, I have seen two cases of acute osteomyelitis of the frontal bone which occurred before any operation had been done, and both those patients recovered.

Mr. HUNTER TOD: In the three cases which I have seen the infection was pre-operative. There was no true meningitis directly from involvement of the bone, but as a final stage, secondary to the sinus infection, the path of extension of the infection appears to be the venous channel in the diploë. It is a type which is so rare that it is not always recognized. It must not be confused with simple necrosis, which is localized to the mastoid bone and is occasionally met with in severe mastoid disease.

Mr. TILLEY (in reply): The description of the case is somewhat imperfect: the notes I took have been lost in the hospital. The father says the boy was admitted three days before last Christmas Day, and I operated on the day following admission. On the day of operation the tissues were swollen and œdematous over the mastoid region, and I think the osteomyelitis had commenced at the time of the operation. When the antrum was opened the roof of the tympanum was found to be destroyed and its place taken by granulation tissue, so that one could pass a probe straight into a subdural or even a temporo-sphenoidal abscess. The patient was put back to bed, but, instead of the œdema disappearing in a few days, it became more marked, and spread, so that in two or three weeks it had extended over the greater part of the left temporal, parietal, and occipital regions, and the general condition had become worse. He had a slight temperature every night. Therefore we decided to open the wound again. It was then that I found the squamous portion of the temporal, and a part of the lower posterior portion of the parietal bone, and the occipital bone in the region of the mastoid process involved. The bone was soft. I cut away into healthy tissue in all these regions. The strange feature was the extraordinary appearance of the dura mater, which looked like pale bacon rind, and I dared not go through this lest I should expose the pia or enter the cortex. He had no meningitis. I left the dura to take its chance. In the course of some weeks it settled down, and I think his dura is now in a more or less normal condition. I must try Mr. Stuart-Low's cage, for it seems to have advantages. I think, however, with Mr. Mollison, that the narrowing of the meatus had nothing to do with the dressings in this case. The patient was in hospital some six months, and the septic condition of the wound was extreme, and lasted for weeks. I think any soft cartilaginous tissues would be apt to become necrosed, and that the present anatomical conditions would be accounted for by the severity of the inflammation and consequent cicatrization which occurred. Mr. Tod pointed out what probably most of us have noticed in osteomyelitis of the frontal bone—viz., the low degree of pyrexia. This boy had no rigors, and his temperature was never anything remarkable. Dr. Paterson asked why osteomyelitis occurred more in the frontal bone than in the temporal region. It may possibly be explained by the fact that the vascular supply in the temporal region is much more free than is that in the frontal bone. If you open the frontal sinus in a chronic empyema and clean out the mucous membrane for twelve days you see nothing there except a mother-of-pearl-like appearance on the posterior wall. On the tenth or twelfth day red spots begin to appear, and in four or five weeks the frontal sinus will be full of granulation tissue, whereas, in the case of the mastoid antrum you can see plenty of granulations at the end of a week. There is a better vascular supply, a better leucocytic infiltration, and a better defence against infectious organisms. Dr. Kelson asked if osteomyelitis occurred in the temporal bone without a previous operation. In this case the osteomyelitis had started when we opened the wound, because the roofs of the antrum and tympanum were already destroyed, and the condition spread until the second operation was performed. Acute osteomyelitis, independent of operation, does occur in the frontal sinus, and I have published a record of such a case.[1] At the time I operated on that patient the osteomyelitis had spread to such an extent that in a week or two we had to take away nearly the whole left frontal bone. The patient recovered. Nevertheless nearly all the cases in the frontal bone which I have seen have been post-operative. I have seen only the one case of mastoid osteomyelitis which I show to-day, and hence my experience of the complication in this situation is (fortunately) rare.

Extensive Symmetrical Lupus Erythematosus.

By W. STUART-LOW, F.R.C.S.

A MALE, aged 45. No family history of tuberculosis, but of cancer on the mother's side, and in the case of one of his sisters at the age of 47. He has had a very hard life, having had to maintain himself at the age of 15. The skin condition has been present ever since he can remember, but has extended more rapidly during the last few years, especially on the scalp. The crusting on the edge of the left auricle has only existed for six months : it began over a small bean-shaped area, and has always had a blackish-brown colour. As the crusts are removed they rapidly re-form, and destruction has been marked during the last two months. Suspecting that there might be an element of epithelioma at this place a piece has been removed by Dr. John MacKeith, whose patient he is, and submitted to Dr. Wyatt Wingrave for microscopic examination. Dr. MacKeith has very carefully studied the case from the point of view of possible tuberculosis, but has found no corroborative evidence of tubercle bacilli.

Liquor arsenicalis has been administered in increasing doses since Dr. MacKeith first saw him in August last, and locally the ulcer has been touched up at intervals with acid nitrate of mercury. He complains of pain in the ear, especially in cold weather. There is a large patch of lupus erythematosus on the outer side of the left thigh.

DISCUSSION.

Mr. W. STUART-LOW ; Dr. Wyatt Wingrave's report on the specimen from this case states that it is a most unusual case of epithelioma being grafted on to lupus erythematosus. In my experience, this is unique. I would like an expression of opinion as to the best treatment. I intend to amputate the auricle, and will show the patient at a subsequent meeting.

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[1] *Brit. Med. Journ.*, July 7, 1917, p. 7.

Dr. H. J. Banks-Davis: I thought, judging from a case which I reported in the *Proceedings* in 1914, that this looked like epithelioma of the helix apart from the lupoid condition on the face. I removed the entire helix, but none of the glands, as I could feel none. The patient was a very old man, and I did not remove any glands at the time of the operation. Several members predicted a recurrence—but such has not taken place. Two years ago I showed another similar case in an old man. The eroding surface was considered gummatous, but it proved to be an epithelioma and the auricle was removed.

Mr. J. F. O'Malley: Is the diagnosis of lupus erythematosus definitely established? Can ordinary lupus vulgaris be excluded?

Mr. W. Stuart-Low (in reply): There is little doubt about this being lupus erythematosus, the symmetry and chronicity are in favour of this diagnosis.

Case of Double Facial Paralysis due to Bilateral Tuberculous Mastoiditis.

By W. M. Mollison, M.Ch.

A child, aged 13 months, was admitted to Guy's Hospital on October 12 of this year. Otorrhœa began at the age of six months, and has been considerable ever since. A swelling was noticed over the left mastoid process the day before admission; the change in the face was only noticed four days previously. From both meatuses there was profuse foul otorrhœa; there was considerable swelling over the left mastoid process and the skin over this was red. The face was without creases, and crying produced no change.

At operation the mastoid process was found to be soft and necrotic, and a series of sequestra were easily scraped out with a "sharp spoon": the dura mater of the middle fossa was exposed and covered with granulations.

Six days later the right mastoid was operated on and a similar condition found.

The child has made a good recovery.

DISCUSSION.

Mr. HUNTER TOD: How was this infant fed? Was it breast fed? If not, was the milk boiled? It is now recognized that tuberculous mastoiditis is nearly always due to infected milk. It is most unusual to get double tuberculous mastoid disease. Were there any enlarged glands? Generally the pre-auricular and cervical glands are affected, and then the question arises as to whether they should be removed. What is the experience of Mr. Mollison and others with regard to facial paralysis? Tuberculous disease of the middle ear frequently begins in the region of the facial canal, and if facial paralysis occurs, recovery seldom takes place. Has this mastoid completely healed? If so, there cannot any longer be tuberculous disease. These cases are difficult to treat, and we know comparatively little about the prognosis, except that the disease cannot be said to have been eradicated until the mastoid cavity has remained completely healed for a considerable period.

Mr. W. STUART-LOW: Have tubercle bacilli been found in the discharge? There are many cases, even more pronounced, in which tubercle bacilli cannot be discovered. External fomentation with Tidman's sea salt—or with sea-water if the patient is at the seaside—is a good method. Iodide of lead ointment should also be rubbed in for a considerable time.

Dr. PERRY GOLDSMITH: Mastoid suppuration in very young children is often loosely termed tubercular. Sometimes the tubercle bacillus cannot be found in children or even in adults. In a fairly large number of cases under my care the time of healing was far prolonged beyond the six weeks taken in this case. The mastoid cells are scarcely developed in a child of this age. This could hardly have been a mastoid abscess as it healed up so quickly.

The PRESIDENT: I recall a somewhat similar case, in which the question of tuberculosis was a prominent one. There were really two cases, twins, 10 months old. For two months before I saw them they had each suffered from double otorrhœa and enlarged cervical glands. The source of the milk was inquired into, and was supposed to be quite beyond reproach: the cows were kept by a gentleman farmer, who specialized in supplying milk to babies, and had his cows periodically examined. My opinion was that the disease was tubercle, and inoculation of guinea-pigs proved it to be correct. We put the Medical Officer of Health on to the track of the milk, and it was traced to a tuberculous cow in this "model dairy." Another case cropped up in the practice of the physician who saw my case in which the child died of meningitis, and the milk was traced to the same cow. In these twins, there was only one of the four facial nerves paralysed, and perhaps that was partly my fault, for it occurred some days after the operation; however, the case recovered. Three mastoids were operated upon. Both those children put on weight during the whole of the treatment, and never went back. Tuberculin injections had apparently, if anything, an unfavourable effect on the children. I think most temporal bone cases in babies are tuberculous, and are due to the milk, and I do not regard facial paralysis, though frequently occurring, as by any means a necessary concomitant. The glands were removed three or four months afterwards by a general surgeon: tonsils and adenoids were removed by myself. These children are now, after several years, both strong and healthy.

Dr. KELSON: The fact of rapid recovery need be no argument against the condition being tuberculous. I have had several such cases, and they have healed with marvellous rapidity, even when the disease has been extensive. But the trouble is that the disease is apt to reappear after a year or so. I showed here one case which was operated upon by myself three or four times, at intervals of two or three years, the first being at the age of six months.

Mr. MOLLISON (in reply): We did not find tubercle bacilli, but the case was tuberculous clinically. There was a thin foul discharge from both ears, there was no pain, and it was only by accident that the swelling over the mastoid was discovered at all. There were many glands on both sides: pre-auricular and infra-mastoid. With regard to the feeding: One child I know about had been fed on the milk of one cow, which had been kept specially for it and tested by tuberculin. The child developed typical tuberculous mastoid disease. The second case was that of the eighth child in a family, which had been breast fed. This child was 8 months old and the mother and all the other children were healthy. This child developed what appeared, clinically, to be tuberculosis of the middle ear: another aural surgeon had seen the child, and had diagnosed it as tuberculosis, advising immediate operation. There may be other paths of infection besides ingestion with the milk.

Case of Necrosis of the Internal Ear, causing Sequestration of the Labyrinth; Recovery. (Sequestrum shown.)

By W. M. MOLLISON, M.Ch.

W. S., AGED 60, attended in the aural out-patient department at Guy's Hospital on account of pain in the left ear. For years he had suffered from left-sided otorrhœa; for three months he had had headache and attacks of vertigo, but had continued his work of a bricklayer till three weeks ago when he felt too ill. Recently he had been somewhat delirious at night. There was a large polypus in the left meatus with a foul otorrhœa. There was no swelling over the mastoid process but a little tenderness on percussion He looked old for his age and pale.

He was admitted and operation performed. On opening the mastoid process, pus was found and a sequestrum; on exposing the antrum all anatomical landmarks were absent, the region of the external semicircular canal was eroded and separated posteriorly by a line of necrosis and granulations; further investigation revealed this trench, as it were, surrounding the labyrinth, and the whole labyrinth was found to be movable, and a very slight pull brought it away whole. The deep hole thus revealed was found to be bounded above by granulations on the dura mater of the middle fossa, and behind by granulations on the dura of the posterior fossa. The facial nerve lay across the hole on granulations, and was damaged at some stage of the operation. The patient still has paralysis. For a few days the patient was mildly delirious, but, as can be seen, has made a good recovery.

The condition was not tuberculous.

DISCUSSION.

Dr. D. R. PATERSON: To what extent ought one to undertake cutting away of bone for the delivery of the sequestrum? In three or four cases I have had considerable difficulty: the petrous bone is too hard to break up *in situ*. I contented myself with loosening it under an anæsthetic, and leaving it for a time. It was impossible to deliver it without cutting away bone considerably, and I have always had in mind the possibility of a connexion with the carotid canal, or thought that the sequestrum might, in its inner part, be attached to the auditory nerve, and be in communication with the interior of the skull. Loosening it in three or four sittings, made it possible to deliver it safely. I do not know how far one can venture to go in the forcible extraction of such sequestra.

Mr. J. F. O'MALLEY: Can syphilis be entirely excluded in this case? If not, the case must be regarded as one of septic necrosis. It is rather unusual for an ordinary sepsis to isolate the labyrinth in that way. It is more likely to follow syphilis.

The PRESIDENT: In a case I reported to the old Otological Society many years ago, the whole labyrinth and cochlea came away complete. In that case the original trouble followed scarlet fever, the child being also the subject of congenital syphilis. The fact that the facial nerve recovered afterwards was surprising to me: I should have thought the whole part of the facial nerve which is included in the temporal bone would have been destroyed. The recovery was first noticed because the girl had had double facial paralysis, and yet complained, three weeks after the operation, of her face having become crooked. This was due to a return of power on the operated side.

Case of Acute Mastoiditis followed by Thrombosis of the Internal Jugular Vein as far as the Clavicle; Recovery.

By W. M. MOLLISON, M.Ch.

A. F., FEMALE, aged 8, was operated on for acute mastoiditis. The temperature, which had been 103·6° F., fell to normal in two days. On the third day after operation it rose to 102° F., and for some days fluctuated between 100° and 102·5° F., till on the eleventh day the patient had a rigor.

Operation was performed. On opening the wound, pus was found about the lower part of the lateral sinus; the sinus was opened and found thrombosed. The jugular vein was exposed in the neck and found to be solid with clot as far down as the clavicle. A piece of vein was excised and is shown. There was never any stiffness of the neck, and two days after the operation the child sat up in bed. Before recovery she had several rises of temperature. She was treated once by injection of 1 c.c. of collosol manganese, but it is difficult to say whether the subsequent fall of temperature was a result of the treatment or merely a coincidence.

DISCUSSION.

Dr. H. J. BANKS-DAVIS: Some years ago I showed here a girl whose internal jugular vein I had to excise for a similar disease. It was mistaken for enteric fever. She was sent into the hospital from one of the fever hospitals, with a large swelling in the neck. The sloughing wound in the neck was treated with "soap solution," for the formula for which I am indebted to Dr. Dundas Grant. It is made into an emulsion, and cyanide gauze is dipped into this, packed into the wound, and it is astonishing how it clears up the condition. The formula is: Potash soap, 1 dr.; soda soap, 1 dr.; olive oil, 1 dr.; water to 2 pints.

Dr. PERRY GOLDSMITH: Acute mastoiditis in which there is a temperature of 103° F., falling to normal in two days after operation, and subsequently rising to 102° F., with remissions, always, in my experience, means exposure of the lateral sinus. Often there is a peri-sinus abscess, which has been unnoticed at the operation. Some American surgeons say that in all mastoid operations the lateral sinus should be exposed as a matter of course. I do not agree with that, but peri-sinus abscess occurs often after such operation. In the note it says the temperature fluctuated between 100° F. and 102·5° F., till the eleventh day, when the patient had a rigor. One would expect an unexposed sinus case to have a rigor by that time. With regard to ligature of the jugular, a person can have thrombosis of the lateral sinus which will look after itself and may not be discovered except by accident. In two cases I have operated upon the lateral sinus has been exposed, and there has been old obliteration without trouble, except periodical attacks of old mastoid symptoms. If one is careful to get the flow of blood from behind and from below, it will not always be necessary to ligate the vein in the neck. It must be remembered that in curetting the bulb so as to get a flow from below, we are liable to shift the clot in the inferior petrosal sinus, which is a protection against the cavernous sinus becoming involved. With regard to removing a portion of the vein, it does not seem good surgery to remove a small portion of the vein. What can be the object of taking out an inch or so? Either ligature it alone, or take out the whole vein. If it is ligatured at the lower end, the upper part should be brought out of the wound: otherwise there will be a bag containing a clot, which is sometimes, though not always, septic.

Dr. D. R. PATERSON: I have had a similar experience in a chronic case. Septic matter was traced away down into the cervical region, and it was impossible to follow it below the clavicle. I passed a probe a considerable distance down the vein, and satisfied myself that it was quite empty for some distance into the chest. The vein was excised, because it was in a very fœtid condition, and the patient was returned to bed with very little hope of it doing well. Nothing was applied afterwards, except an ordinary dressing, and yet the child did excellently.

The PRESIDENT: I am glad to hear that Dr. Goldsmith does not go as far as some of his neighbours in the United States. The impression I have had of most American otologists is that they invariably remove the whole vein in the neck, and occasionally dissect out the bulb.

Mr. MOLLISON (in reply): I agree with what Dr. Goldsmith says about the lateral sinus: if the temperature is raised in a case of acute mastoiditis the sinus should always be exposed.

Two Cases of Radical Mastoid Operation for Cholesteatoma, with Preservation of the Matrix (Fourteen Years and Six Months after Operation respectively).

By J. Dundas Grant, M.D.

Case I.—The first is a gentleman, aged 56, on whose left "mastoid" I operated fourteen years ago in the presence of several French colleagues, who agreed with me as to the singular resemblance of the matrix to an unusually delicate skin-graft. The progress of the case was very rapid. The patient only came under my notice again in July of the present year on account of deafness in the other ear with jingling noises and giddiness. The ear formerly operated on is now his "good" one, and he hears with it a whisper at 16 ft. The cavity is a typical "radical mastoid" cavity, but smoother, drier and whiter than I usually secure.

Case II.—The second is the lady whom I brought before the Section at the meeting last May about a fortnight after the operation. It was then nearly dry, the osseous ridge being alone uncovered. It has kept quite dry.

DISCUSSION.

Mr. J. F. O'Malley: Dr. Dundas Grant had an excellent result in the case of the lady whom he has shown here before. A week or two after that occasion I got a case, upon which I operated, and found a huge cavity filled with cholesteatomatous material; the facial ridge was destroyed, and no landmarks were left. The cavity was lined with a beautiful smooth filament. Acting on Dr. Dundas Grant's advice, I left it completely intact, and with the most excellent result. The only delay in healing was at a spot posteriorly on the inner aspect of the wound in the mastoid. There were a few granulations here which I had to suppress by applying caustic. Where the membrane covered the cavity the healing was perfect.

Dr. Perry Goldsmith: I was present when Dr. Dundas Grant operated upon this man. The French visitors discussed, with a good deal of vigour, the leaving of the matrix behind at all. Others have not had the same good results from leaving the matrix. Why should the matrix be left to cover the disease which is beyond?

Dr. D. R. PATERSON: Following Dr. Grant's suggestion, I have left the matrix behind. In one case a boy had very extensive disease on both sides, long-continued, and a very large cholesteatoma. At the radical operation I left the matrix in both, and there was an excellent recovery, with good hearing. In the dry class of case, leaving the matrix turns out excellently, because there is not a huge cavity to line and one escapes the vicissitudes which accompany trying to line it by grafts.

Dr. DUNDAS GRANT (in reply): The speakers in discussion have confirmed my views. Much depends on the appropriateness of the cases. You cannot have this formation unless the case is of very old standing; the cases are not now allowed to continue without treatment so long as formerly. Dr. Goldsmith has referred to the question of disease being still below the matrix. If this were so, the formation of the matrix, which is a homogeneous membrane, would be interfered with; if it is white and adherent one can be pretty sure there is no active disease there. The question has often been discussed, and critics have quoted Kirchner, who contended that the cholesteatoma extended into the bone. He had made only one observation, and published it, but what the nature of the case was nobody knows. Katz, among others of his countrymen, opposed his views, and showed that it was not an ordinary nor even a possible occurrence. I think everyone is now agreed that the cholesteatomatous membrane is an attempt at dermatization, and is, as a rule, a very successful attempt. When it is complete it should be retained. Mr. O'Malley has referred to the spot where he had a little trouble; that is just inside the posterior margin of the wound. Those with experience of radical mastoid operations will always be on the look-out for that. If the little mass of granulation tissue there is taken away the cavity dries up. The best way to deal with that is to puncture it with a fine galvano-cautery as recommended by Stacke in his original work. It causes a limited area of sclerosis in the inflammatory tissue. One does not know how far the contraction is going to extend if nitrate of silver be applied.

Chronic Middle-ear Suppuration.

By JOHN F. O'MALLEY, F.R.C.S.

PRIVATE I. M., aged 20. Left ear discharging constantly for over two years; no history of disease in childhood. "Pain for about eight months in bone behind ear, worse at night."

This case is shown for the purpose of eliciting expressions of opinion on the following important points:—

(1) For the purpose of a pension award is one justified in stating that this trouble began two years ago and not previously (see right ear)?

(2) Assuming that he has been in the Army over two years, should his condition be attributed to (*a*) military service, or (*b*) only aggravated by it, or (*c*) not affected by it?

(3) Is a radical mastoid operation positively indicated?

(4) What is the surgical prognosis, apart from the function of hearing?

DISCUSSION.

Dr. PERRY GOLDSMITH: This man has been in hospital a considerable time, and it is necessary to assume the idea that it is a psychic case. There is no objective evidence in regard to his pain, and he is coming before a Pensions Board, and he knows he will be paid if his deafness is due to service, or if it has come on after the war commenced. One hesitates to question the good faith of an individual, but I do so in 99 per cent. of cases, otherwise we may have pitfalls. This man says his trouble came on after the war started, but he admits that he always sat in the front at the theatre, and he would not be likely to do so unless he could not hear, sight being normal. He says that within a short time of enlistment he was bathing and got some water in his ears, and from one ear he had a discharge without pain a few days later. That is not the course of acute middle-ear suppuration, but of ordinary chronic middle-ear suppuration in which there is perforation lit up by the presence of water in the middle ear. I therefore think his condition was aggravated by war service, and that it existed before the war. The radical operation does not seem to be indicated, but I do not think he will get rid of the pain until some operation cutting the skin is done. His pain I regard as largely psychic. If you make the pressure greatest on the right ear, he will still have pain in the left. There is possibly some chronic sclerosis of the mastoid which clears up after operation. If he has a cholesteatoma and a matrix, the surgical prognosis is very good. I see no reason for regarding the prognosis as unfavourable, though, before operation takes place, it would be well to know how far the labyrinth is capable of function and what is the perception for high tones.

Dr. DUNDAS GRANT: It is unfortunate that, from the nature of things, men had to be taken into the Army without being examined closely as to the condition of their ears. If that had been done, many in the Army would not have been there. We have to give the man the benefit of the doubt, and unless we feel very confident that the condition is an old-standing one, we are bound to accept the man's statement that his ears were well before enlistment. This man has one good ear, and "sclerosis" changes in the other. If there was old trouble, it must have been very slight. This detracts much from the force of Dr. Goldsmith's argument, for when he sat in the front at the theatre he had one good ear. I agree with Mr. O'Malley, that he had an old-standing condition which was re-awakened since he joined as the result of his exposure, and I do not think we are justified in penalizing the man on that account. He has, I imagine, a disability of about 20 per cent. Everything should be done to cure the suppuration. Perhaps 30 per cent. would be fairer than 20 per cent. I think one would have to say his trouble was aggravated by military service, that, beginning as disease, it was aggravated by injury. He gives a definite account of shell explosion, but that it would produce such pain as he has had, I think doubtful. I hardly suppose that would wake up inflammatory changes. I expect everything has been done to cause the discharge to cease. I examine such cases with a suction speculum, and sometimes with a bent probe, such as Mr. Hunter Tod's. But I cannot say whether the discharge here comes from the antrum, or from the direction of the Eustachian tube. If from the antrum —and one sees the formation of well-marked cholesteatomatous products—it would indicate old-standing disease, and operation would be justifiable. I do not know what the hearing in the affected ear is. If it is very bad, a mastoid operation will not make it worse: if it is fairly good, the operation will leave the hearing only moderate. The presence of pain would be a further indication for operation.

Mr. W. STUART-LOW: We have seen very many of these cases. If a man had discharge from the ear, he was put back to Grade 3. If the ear dried up, the man would perhaps be taken into the Army. Such men ought to be cautioned not to bathe. This man's trouble was re-started by bathing. I do not doubt that the condition has been chronic for years. I would operate because the discharge has gone on so long, and is likely to continue. Everything should be done to favour the discharge drying up; I would have mouth and teeth seen to. If he is not right in three months, he should certainly have the radical mastoid operation performed on him.

Colonel A. D. SHARP: There should be no difficulty in answering the questions here set out. The disability was certainly contracted in the Service, and as certainly was it aggravated by service. But I do not think it is attributable to military service. Dr. Grant has summed the case up correctly, but the percentage I would award would be 15. If the man says he will not be operated upon, and as he has the right to refuse, his refusal should not influence the Board in determining his pension claim.

Mr. J. F. O'MALLEY (in reply): The only difference of opinion expressed by speakers relates to the question of an operation. We seem all agreed that the man had disease in the ear prior to two years ago, and also that the condition has been aggravated by military service. The fact of an antecedent discharge would enable one to exclude the heading "Due to military service alone," and one would assess the disability lower than if it had been entirely due to military service. The man showed no objection whatever to an operation. He came to me and said he could not sleep. After questioning him pretty thoroughly, I put the question to him, "Are you bad enough to undergo a severe operation?" He did not hesitate, but at once said he would like it very much. One can see a distinct focus of chronic inflammation, with caries in the attic, and a fairly large mass of granulations, dependent from the meatal roof. I think he has sepsis and granulation trouble in the aditus also, and possibly in the antrum. I should operate to get rid of it. I asked the last question because, apart from function, I wanted to know if others agreed with me as to the site of the lesion. A localized lesion in these cases enables one to give a more promising prognosis, for one is likely to be able to remove the whole of the disease.

Section of Otology.

President — Mr. HUGH E. JONES.

Deafness associated with the Stigmata of Degeneration.

By HUGH E. JONES (President).

THE subject uppermost in my mind just now is one that has not received much public attention from aural surgeons, and one upon which there may be many differences of opinion. On the one hand, it may be objected that "functional" or "neurotic" deafness is known to all and recognized as such by otologists; on the other hand, that I bring very little direct evidence and not any of a histological kind in support of my speculations. This paper is an attempt to run to earth those vague terms and to associate with them certain visible signs of diagnostic value.

Let me make it clear that in using the term "stigmata of degeneration"[2] I am not dealing with extremes, with malformations or perversions and arrests of development on a large scale, nor am I dealing directly with the stigmata which affect the face, nasopharynx and middle ear, and which cause direct interference with the conduction of sound—a subject too large and important to include in this paper—but with the more subtle signs and effects of degeneracy which come under one's notice every day—and which may materially affect the practice and reputation of our specialty.

I suggest that there is a kind of deafness due to inborn degeneration of one or more sets of the neurons which connect the ganglion spirale with the brain cortex and that this degeneration is associated with

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[1] At a meeting of the Section, held January 17, 1919.

[2] An excellent account of the major and minor malformations of the ear will be found in Ballantyne's "Ante-natal Pathology and Hygiene," "The Embryo," pp. 436 *et seq.*, and in Talbot's "Degeneracy."

degeneration of other more or less remote epithelial tracts: that these associations have diagnostic value. If you consider that these speculations are worth discussing I hope you will contribute many facts, criticisms and suggestions which will be helpful in the elucidation of a difficult problem.

In 1909 I read a short paper at the annual meeting of the British Medical Association.[1] This paper contained an analysis of 210 consecutive new hospital ear out-patient cases, at the Liverpool Eye and Ear Infirmary—135 of these cases, i.e., 64 per cent., showed auricular defects such as are associated with degeneracy. This in itself was a high proportion, but in the cases of chronic tympanic catarrh and otosclerosis (I couple these together as the diagnosis may not always have been correct) the proportion was forty-nine defective auricles to nine good ones, while in nervous affections of various kinds the figures were twenty-two to three. In what may be termed accidental affections the proportion was thirty-five bad auricles to forty-one good. In the discussion which followed it was quite properly pointed out that statistics, especially when the numbers were small, were notoriously fallacious and that until the proportion of defective auricles to good ones was established the figures given could not be regarded as proof.

It might be thought that after this criticism I would have immediately set to work to collect statistics in all directions, but unfortunately my zeal for this form of research had reached its limit, and I regret that even now I cannot provide any large body of figures. I have, however, been keeping my eyes open and by classifying and counting ears in trams, trains, and public assemblies, from time to time, have satisfied myself that defective auricles do not occur oftener than one in five of the general public. I believe the proportion is considerably lower. On the other hand, among ear patients, without making regular notes of the feature but having it always in mind, the last nine years' practice has confirmed me absolutely in the belief that the analysis given exhibited a general truth.

Two Sundays ago I took part in a Church parade of volunteers; while seated in the front row, and painfully conscious of the things I had left undone, I analysed the auricles of the choir boys. There were twenty-eight boys and every one of them had well formed auricles and so had the organist and clergyman who preached. At the church door I looked at my fellow officers' ears and found four defective auricles (pairs) out of about thirty. As the men, to the number of about 200, filed out of the church I glanced at them and about one in five had defective auricles. This proportion I regarded as a high one, but it must be remembered that a proportion of these were C3 men. If anything can be deduced from the correctness of the form of the choir boys' auricles it is that the combination of a good ear for music and executive power are associated with good auricles and perfect functional continuity of the organ of hearing.

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[1] *Brit. Med. Journ.*, 1909, ii, p. 1137.

Now take 158 consecutive eye patients examined a few days ago: 129 had good lobules, fourteen had doubtful ones which might be counted either way, while fifteen only had definitely defective auricles—of the latter, three had interstitial keratitis, three senile cataract, one glaucoma, two asthenopia, one congenital cataract, one congenital ptosis, one myopia and cataract, one convergent strabismus, one astigmatism, and one muscæ volitantes. If I weight the evidence against myself by counting doubtful auricles, twenty-nine patients out of 158 had defective auricles—in round numbers one in five. The hearing was not examined but none of these patients was actually complaining of deafness.

On the same day I went into the ear department and examined ten consecutive cases. Four of these had good auricles: one deflected septum, one pharyngeal ulceration, one tonsils and adenoids, one suppurative otitis media. One case was doubtful, with chronic suppurative otitis. Five had definitely defective auricles: one otosclerosis and ? functional deafness, three chronic suppurative otitis media, one loss of bone conduction on both sides (cleft helix, attached lobule and Darwin's tubercle). That is, amongst the actual ear cases one had good lobules, there was one doubtful, and five had definitely defective auricles.

Taking these figures therefore for what they are worth—amongst individuals generally with sound and defective hearing the proportion of good to bad auricles is about five to one—but taking the deaf alone the proportion is over 60 per cent. defective auricles, while if degeneration deafness cases are alone taken the proportion rises to at least five defective auricles to one normal.

I now come to the case which may be said to form the text of my paper (and to which I shall refer as the text case). A boy, aged 17, wished to enter the merchant service but was afraid that deafness and imperfect sight might interfere with his career. He had already consulted five aural surgeons in various centres, and had been under treatment of one kind or another for several years, and finally, at the suggestion of one of the aural surgeons, his parents had taken the boy to a medical electrician and had spent £150 on electrical treatment without benefit. His father had died at the age of 45 and his grandfather at the age of 43, but no family history of deafness was obtained. The boy had narrow, attached lobules. No enlargement of tonsils or adenoids. He was of a somewhat "neurotic" type, but distinctly intelligent, if erratic.

HEARING.

	Right		Left
Acoumeter	5 in.	...	6 in.
Bone conduction, C' (256)	$\frac{20}{30}$	...	$\frac{20}{30}$
Air conduction, C' (256)	$\frac{40}{60}$	...	$\frac{40}{60}$
C_3(16), C_2(32), C_1(64), heard by both ears.			
Galton-Edelmann	0·5 mm.	...	0·3 mm.

SIGHT.

Right vision	$\frac{6}{18}$ $\bar{c}$ $-1{\cdot}75$D. = $\frac{6}{9}$.
Left vision	$\frac{6}{18}$ $\overline{1}$ $\bar{c}$ = $\frac{6}{12}$ partly.

No night-blindness complained of. Examination by the ophthalmoscope showed pigmentary degeneration of the peripheral zone of each retina, but not of the type of retinitis pigmentosa—i.e., there were no spider-patches of pigment. My diagnosis was correlative degeneration of the auricles, one or more auditory neurons and the pigment layer of the retina—all epiblastic tissues. The symptoms were in many respects like those of senility.

You will observe that the hearing has a good range—that there is no total loss of perception at either end of the normal scale, that the defect is nearly equal in the two ears, that there is a distinct loss of bone conduction and that the loss of air conduction is not more than could be accounted for by the former reaction. There was no paracusis Willisii. The fatigue reaction which I generally find prominent in these cases was not present, and the boy appeared to be giving me his attention. This absence of fatigue reaction probably meant that the excitability of the neurons was permanently low, or the synapse substance permanently defective or that recovery of function was too slow for the time allowed for the experiment. He was an only child, an interesting lad and keen to enter the merchant service, a choice of profession which was probably due to heredity and a restless disposition. His stepmother said he was difficult to manage and not a success at school. He did not show any evidence of congenital syphilis unless the degeneration described could be so interpreted. His father and grandfather died at an early age, and I would here point out that the ear symptoms bear a similarity to those of senile deafness, and may perhaps be regarded as caused by presenility.

I have taken this case as a text because it is rarely that one finds the conditions under discussion uncomplicated by or unassociated with other lesions of the organ. I say "uncomplicated by" because I believe degeneration to be the underlying condition and predisposing cause of many diseases of both the middle and internal ear: that it makes the organ more vulnerable and less amenable to treatment.

The Sites of the Main Degeneration Lesion.—The absence of paracusis and loss of low tones probably exclude otosclerosis, though Professor Albert Gray's fine work has proved that this condition is itself an idiopathic degeneration, and my statistics go to show that it is frequently associated with degenerate auricles. Fortunately, for my purpose, it is not necessary to decide whether sound is analysed by the cochlea or by the cerebral cortex, for the power of analysis in my text case is good, and it is not conceivable that one cochlea or both and cortex could be seriously impaired without the sound analysis being affected. The defect must therefore be somewhere between these parts. If we accept the neuron theory as completed by Professor Sherrington's "Synapse" the explanation of the phenomena becomes simple. Dr. F. W. Mott[1] in his Croonian lectures says: "The neuron, like other cells, nourishes itself and is not nourished, and it depends for its development, life and functional activity upon a suitable environment. It must also possess an inherent vital energy. In the neuropathic and psychopathic individual it may be conceived that in some portions of the nervous system, especially the brain, there may exist *communities, systems or groups* of neurons, with an inherited low power of storage energy, rapidly becoming exhausted and especially liable to depression of function," and, again: "Morphologically, I conceive that the process of primary degeneration is an evolutional reversal commencing in the structures latest developed, namely the myelin sheath and the terminal arborisations and collaterals of the neurons," and, one might add, in the hypothetical synapse of Professor Sherrington. Sir William Milligan and Colonel Westmacott applied this explanation to the mutism caused by war shock, and Colonel Hurst[2] gave a demonstration of its applicability to concussion deafness. I think, however, in these cases that the true psychical or cortical elements must nearly always be invoked. Let us assume then that the defect of hearing in my case results from degeneration of the neurons connecting the mid-brain with the cortex, causing imperfect contact or a rapid exhaustion of their vitality or of that of the synapse substance, or a permanent low degree of excitability and of power of transmission. This supposition removes the necessity for any attack on the brain cortex. So far from showing signs of mental degeneracy, many of my patients have brains of a relatively high order. In using the term "stigmata of degeneration" I do not imply that I agree with the criminologists that all or even many individuals exhibiting minor defects of the pinna have criminal tendencies or defective mental powers; on the contrary, my suggestion is that such defects of the pinna are associated mainly with localized *actual* or *potential* degenerations of the auditory nerve tract.

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[1] *Brit. Med. Journ.*, 1900, i, p. 1517, &c.; see also Allbutt and Rolleston's "System of Medicine," 1910, vii, p. 173 *et seq.*

[2] *Proceedings*, 1917, x, Sect. Otol., p. 115

The occurrence of progressive and regressive variations will be discussed later.

Embryological.—I may be asked what possible connexion can the lobule of the ear—a mere piece of skin—have with the auditory nerve? Precisely because the lobule of the ear, the main site of visible variation is a piece of skin—without cartilage—in other words, is of epiblastic origin. How far mesoblastic tissue enters into the constitution of the pinna the embryologist does not tell us—but the pinna is clearly developed from tissue lying outside the "cleft membrane" in contradistinction to the structures of the middle ear which are hypoblastic and mesoblastic in origin. About the time that I saw the text case I examined a child with microphthalmos and coloboma of iris and choroid. The pinnæ were very well developed and the hearing was perfect. This was clearly a case of defective development of mesoblastic structure. When the crystalline lens is the subject of congenital or lamellar cataract the enamel of the teeth is usually defective; when there is malformation of the whole auricle, fusion or maldevelopment of the ossicles, associated perhaps with cleft palate and facial asymmetry (as in the case reported by me in the *Transactions* of the Otological Congress in 1899),[1] the failure of development concerns hypoblastic and mesoblastic tissues, while those of neuroblastic origin are unaffected. I think, therefore, it is fair to assume that failures of development and localized degenerations are apt to pick out one or other of the great embryonic layers and different parts of the same layer which are functionally related, though failures are not necessarily limited to one layer. From the point of view of the evolutionist they are correlative variations.

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[1] *Trans. Sixth Internat. Otol. Congress* (1899), 1900, p. 403.

Evolutional.—Professor Ray Lankester in "The Kingdom of Man," p. 132, says: "Whilst natural selection may be favouring some small and obscure change in an unseen group of cells, such as the digestive, pigmentary or nervous cells, and that change a change of selection value, there may be, indeed often is, as we know, a correlated or accompanying change in a physiologically related part of far greater magnitude and prominence to the eye of the human onlooker. This accompanying or correlative character has no selection value, is not an adaptation—is, in fact, a necessary but useless by-product." Hugo de Vries writes as follows: "As soon as a plant deviates from its type it will be disposed to do so in more than one character. This type rule holds good for rare and casual abnormalities as well as for the more normal so-called fluctuating deviations from the type. Useful qualities are subjected to it as well as those practically useless, which are usually studied merely on account of the valuable indications they so often give for comparative science." Haeckel asserts[1] that while the pinna is a more or less useful implement in the lower mammals it is quite useless in the anthropoids and man, the conduction of sound being scarcely affected by the loss of the pinna, and that in this loss of function we have the explanation of the extraordinary variety in the shape and size of the shell of the ear in different men. Even if that be true, the degeneration of the lobule or some other part of the pinna may serve as an indication of degeneration of correlated structures which are of functional importance. Regarded as biological variations I take it that these changes would be described as "minor," "continuous," or "fluctuating," and are therefore not specifically hereditary. The tendency to vary is hereditary, and the particular direction and degree of variation depends on nutrition and environment. In this respect they differ from the grosser malformations which are "major" or "discontinuous" variations, and are heritable. The question may now be put: Are these variations progressive or regressive? "Progressive and regressive variations take place in the same individual, giving rise to that inequality which characterizes the development of the so-called degenerates. Thus one and the same man may have a hare-lip or a club-foot and yet be a genius."[1] If this be true of major it is equally likely to be true of minor variations. In the latter the result is largely determined by nutrition and environment. May it not be that we are witnessing a gradual differentiation of men into definite types which are adapted for different forms of activity—the man of action, the student and so forth, much as ants are differentiated into workers, soldiers and the group which propagates the race? The development of the higher brain centres is inimical to instinctive actions. Deep thinking necessitates switching off the special senses. The "brown study" and "absence of mind" may become a fixed habit, and as senile degenerations take place the switching off, which may have begun as a voluntary action, becomes involuntary, and its prevention requires a conscious effort of the will. The charge is constantly made against the subjects of senile and other forms of degenerative deafness: "He hears well enough when he wants to." Amongst soldiers whom I have examined either as patients or for discharge from the Army, I have been struck with the prevalence of the defective lobule. These men, notwithstanding the patriotism and the keenness of the majority, were not fitted to stand the hardships or the sound-concussions to which soldiers are subjected, and consequently became deaf. It may be objected that deafness as a consequence of progressive evolution of one part of the brain is absurd. It must, however, be remembered that the path of evolution is strewn with wreckage, and that "degeneration" is not peculiar to slum-life.

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[1] "The Evolution of Man" (translation), 1905, ii, pp. 708, 709.

Treatment.—I must pay my respects to this time-honoured heading; and, after all, much may be done for the individual. As has been remarked, the condition specially described is rarely uncomplicated, and the otologist can at least treat the complications. The degenerative factor can only be treated on general lines, and these require the co-operation of the physician. Nutrition, choice of work and environment are the main points to be considered.

Preventive Treatment.—This brings us into the domain of sociology and politics. The aim of treatment should be to influence the nutrition of the child from its conception, and its nutrition and environment from its birth. It takes into its scope not only the child but the health and habits of the parent. Whether or not the germ-plasm can be affected by the life and habits of the individual there can be no doubt that as soon as embryonic life begins nutrition plays an important part.

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[1] Hastings Gilford, "The Disorders of Post-natal Growth and Development," p. 120.

In conclusion, I should like to ask if we, as a society of otologists, could not, or ought not, to extend and deepen our influence in regard not only to the treatment of the individual but also to the solution of the sociological problems upon which I have touched.

DISCUSSION.

Mr. W. STUART-LOW: I have listened to this address with great interest; it has made me think, and I have learned a good deal from it. I have always been taught to observe things, but my observation has been thrown into the shade compared with the minuteness and thoroughness of that displayed by Mr. Jones, such as observing the ears of people in church. I have never, until now, attached great importance to the abnormalities in the external ear. I should like the President to give us in greater detail the points about the auricles which he has noticed, and their association. The lobule running into the ear is very characteristic in some people, but I have not noted it specially in connexion with deafness. One distinguished soldier, a patient of mine, has such a lobule. Criminologists say it is a criminal indication, but that is far from being the case in this particular instance. I also know a most estimable and amiable lady with the same type of ear. I once had to deal about a motor car with a man who had a pointed pinna, an indication of acquisitiveness, and I felt he would drive a very hard bargain. What is the significance of Darwin's tubercle? None of these individuals, as far as I know, were at all deaf. I look upon such peculiarities of ears as accidental, without any association necessarily with defective character. I should say there are more likely to be anatomical disturbances in the nose than in the auricle. In future I shall look out for these abnormalities in the external ear. We are aware of the variations there are in the length of the fibres of the tympanic membrane. I have been told that in those who have a sensitive musical perception the tympanic membrane is highly specialized. Does anything similar hold good for the auricle? There is, of course, an intimate connexion between the neurons of the different parts of the brain. We all know the placid face of the deaf person who loses even the ordinary facial expression. Deaf patients find the hearing better after a good laugh, and for such reasons I find it beneficial to order them to listen to such comedians as George Robey, the object being, not only to convulse the facial muscles by laughter, but the movements of the auricle are considerable during this exercise, which has an improving effect on the hearing. The tympanic membrane, too, is stretched during laughter through the tension put upon the tensor tympani muscle. The probability is that just as the nerve terminals in the muscular fibres are acted upon so similar influences may affect the neurons in the nerve centre through the tendrils which join them all together. I have certainly found that listening to music and singing, and laughing freely practised and indulged in, have an improving influence on the hearing of my deaf patients.

Dr. H. J. BANKS-DAVIS: Since I received the abstract of this paper I have made a point of noticing people's ears everywhere. I have never appreciated the possibility that any loss of hearing might be associated with a degenerated or malformed auricle, but I have often observed people "prick up" their ears, in the way animals do, when being tested with the tuning fork. Lately a naval officer whom I was testing with forks delayed his responses in a marked manner, and on being asked the reason said he must have time to "prick up his ears," which I observed he really did. I think the auricle must have something to do with the sense of hearing: otherwise it would not be there. With regard to otosclerosis, especially in women, I have often been surprised to notice how beautifully formed the auricles of these people are. Will the President draw on the board a diagram of what he means by an abnormal and degenerate auricle, for the point is really one of great interest.

The PRESIDENT drew on the board sketches representing his views, and said: The lower portion of the lobule is epiblastic in origin, and it does not contain cartilage. Another defect is too deep a cleft between the lobule and cheek, which, carried to an extreme, would be a cleft between the tragus on the one hand and the antitragus lobule on the other hand. The "Morel ear," which is specially associated with criminality, is a narrow ear with a fairly long lobule attached along its whole anterior border. But extreme malformations are not what I refer to in my paper: I speak of the minor defects. I have seen bad types of auricles in extremely intelligent people. Genius is often associated with degeneracy, but degeneracy is so subtle, and takes so many forms, that it is almost impossible to say whether a man is degenerate or not unless there is some objective evidence of it.

Mr. T. GUTHRIE: May I ask whether the diminished secretion of wax, which is supposed to occur in otosclerosis, might not have some bearing on the subject? The meatus is part of the external ear, and perhaps the decreased secretion of wax indicates degeneration of the ceruminous glands.

Dr. KELSON: As regards degenerate conditions, not only has the lobule adherent anteriorly been noted, but a Frenchman first showed that in tubercular persons the tissues of the lobule were so weak that ear-rings often cut out; whilst in the postero-superior part of the helix Darwin's tubercle has been associated with asinine or Simian characteristics and a pointed projection higher up with those of a satyr. Are any of these conditions really associated with maldevelopment or degeneration of the nervous system or internal ear?

Mr. SOMERVILLE HASTINGS: If your type case is typical, Sir, and if your theory is correct, it is curious that there should be both a middle-ear and an internal-ear deafness. Clearly, the internal-ear deafness would be due to degeneration of epithelial structures, but I do not see how the middle-ear deafness could be of that origin. In the case you cite, the deafness is mixed, that is to say, partly middle-ear: and I wish to ask whether that is the usual thing in these cases.

Mr. W. M. MOLLISON: These cases of quantitative loss of hearing seem to be extraordinarily rare, and that is my difficulty. I take it your type case is one of quantitative loss of hearing: it has a normal lower tone limit and upper tone limit, but the hearing is diminished very much through the whole scale. I recognize that type of deafness but I have not been able to associate it with any particular deformity, though I admit I have not looked specially for it. I have attributed this type of deafness to a degeneration in the patient's family.

The PRESIDENT (in reply): I am glad of the very kindly, though severe, criticism which my paper has evoked. I wanted to know whether otologists did attribute importance to minor abnormalities in the auricle. It is true that my figures are small, but they are true, and I cannot get over their indication. I am sure that among the general public the proportion of abnormal to normal auricles is about one in seven or eight, but in my ear out-patient clinic the proportion is at least half, taking all the cases which come to that department. When one comes to deal with such conditions as otosclerosis and nerve deafness, the proportion of abnormal auricles is very high, about five imperfect to one perfect. Assuming these proportions to be correct, either there is something in the association, or there is not. If there is something in it, what is it? It is in order to set other minds thinking about the matter that I have brought this communication forward. If there is anything in my submittal, I think it must have a large bearing on our practice. Mr. Mollison has pointed out that pure cases like my text case are very rare. I also pointed out in my paper that that was the reason I selected this case as my text: it seems to me to be more or less a pure case. Mr. Somerville Hastings did not seem to think it was pure. In my opinion it is a case of neuron deafness: it cannot be cochlear and it cannot be cortical. There was no difficulty in sound-analysis, so that whether you accept Sir Thomas Wrightson's theory, or Helmholtz's, the lesion must be in the neuron or synapse. Rinne's test was 20 seconds positive: normal hearing with this fork would give Rinne + 30 seconds. [Mr. HASTINGS: Would you not think that showed some impairment of air conduction? I should think there was some impairment or change in the drum or ossicles.] If the cochlea is switched off from the cortex the result of the Rinne test is bound to be affected: if the patient hears nothing it is of no use discussing Rinne. My patient heard sixteen, thirty-two and sixty-four double vibrations, and Galton up to the limit: notwithstanding this the boy was distinctly deaf. I should say his cochlea and cortex must be nearly or quite normal. I say the condition shown by this boy underlies a large proportion of deafness, renders the organ more vulnerable, and perhaps explains some of our difficulties with regard to the Rinne test. The matter is worth thinking about, and that is all I claim: my paper is simply speculative. The question is asked, "Why should the middle ear be affected as often as it is?" I reply, "Why not?" If degeneration does pick out different parts of one layer of the embryo, it is not necessarily limited to one layer. You may find epiblastic changes associated with hypoblastic and mesoblastic changes exhibited in the septum, nasopharynx and middle ear. But after you have removed adenoids, straightened the septum, and treated the middle ear, there is often a residual deafness with which you can do nothing. That is where my suggestions come in. I would not like to advise anybody to spend £150 on electrical treatment of such a case. It is partly as a protest against advice of that kind that I have brought the matter up. I was interested in Mr. Stuart-Low's remarks concerning the advantage of making deaf people laugh, and prick up their ears. The question of musical people is a very interesting one. It is generally said that acuteness of hearing has nothing to do with a musical ear, but I should think otherwise. I can understand a deaf man sitting in his study writing music, but I cannot understand an executant or conductor not having good hearing. He must at least have perfect power of sound-analysis. With regard to the insane, it is perfectly well known that the insane and criminal have more deaf among them than has the ordinary population. This subject is only an extension of what I have been trying to bring forward, but I have dealt with minor variations only. The cases I have brought forward are subject to the influence of environment, and therefore amenable to a certain amount of control: the others are hereditary and only in a small degree affected by environment. I thank you very much for the way in which you have received my paper. It is sometimes advisable to break new ground, even if it is badly done.

Section of Otology.

President — Mr. HUGH E. JONES.

The Radical and Modified Radical Mastoid Operations: Their Indications, Technique and Results, with Notes on the Labyrinthine and Intracranial Complications of Chronic Middle-ear Suppuration.

(Based on an Analysis of 306 Cases of Chronic Middle-ear Suppuration, as follows: Radical Mastoid Operations, 238; Modified Radical Mastoid Operations, 17: Labyrinthitis, 26; Intracranial Complications, 25.)[1]

By J. S. FRASER, M.B., F.R.C.S.Ed., and W. T. GARRETSON, M.D.Iowa, F.R.C.S.Ed.

(From the Ear and Throat Department of the Royal Infirmary, Edinburgh, under the charge of A. Logan Turner, M.D., F.R.C.S.Ed., F.R.S.Ed.)

THIS paper is a continuation of one written by Captain Milne Dickie and the operator (J. S. F.),[2] or rather of the second portion of that paper (B) which deals with chronic middle-ear suppuration and its complications. In the former publications seventy-eight chronic cases were reported, including nine fatal cases (11·5 per cent. mortality). In the present paper 306 cases are dealt with and the fatal cases number sixteen (5·3 per cent. mortality).

The cases now recorded include all those of chronic middle-ear suppuration and its mastoid, labyrinthine and intracranial complications operated on at the Royal Infirmary, Edinburgh, at Leith Hospital, and in private practice between 1911 and 1918—i.e., the chronic cases operated upon since the publication of the previous paper. (The only cases not included are (1) five cases at the Royal Infirmary, of which the records have unfortunately been lost: none of these cases ended fatally. A case of temporo-sphenoidal abscess operated on six months before the War by an otologist who joined up at once. On admission the patient was suffering from septic œdema of the brain and meningitis. The abscess was reopened (J. S. F.) but the patient died soon after admission. A second fatal case not included was one in which the patient suffered from chronic suppurative otitis media (right) with cerebellar symptoms. Autopsy showed that death was due to a cerebellar tumour on this side. (2) Fifteen cases operated upon at the Edinburgh War Hospital, Bangour. These included one recovery from purulent leptomeningitis and one death from metastatic abscess following septic thrombosis of the sigmoid sinus. Total chronic cases not included, 22, with three deaths.)

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[1] At a meeting of the Section, held February 21, 1919.

[2] *Journ. Laryngol.*, 1912, xxvii, pp. 133, 191.

RADICAL MASTOID OPERATIONS: 238 CASES; 248 OPERATIONS.

Sex.—Of the 238 patients, 118 were males and 120 were females.

Age (in decades).—1 to 9 years, 25; 10 to 19 years, 92; 20 to 29 years, 74; 30 to 39 years, 27; 40 to 49 years, 13; 50 to 59 years, 4; age not given, 3; average age, 20 years.

Residence.—Edinburgh and district, 104; country, 134.

Side.—Bilateral, 10; right, 106; left, 122; total, 248 operations.

Cause.—The statements of the patients and their relations as to the causation of chronic middle-ear suppuration are as a rule very unsatisfactory. Most of the patients have forgotten the date and origin of the discharge. The most common causes appear to be scarlet fever and measles. Not infrequently the aural discharge is attributed to a blow on the ear, but in many of these cases examination of the other ear reveals a dry perforation or a scar in the drumhead, and it is hard to believe that the school teacher, who is usually blamed, has struck the child first on one ear and then on the other and that chronic middle-ear suppuration has resulted on both sides. In only 66 cases did the patients or their relations remember the cause of the ear trouble, as follows: Measles, 26; scarlet fever, 25; pneumonia, 3; whooping-cough, 1; mumps, 1; small-pox, 1; teething, 2; cold, 1; injury, 6.

As showing the distribution of chronic purulent otitis media and its complications between the wealthier and poorer sections of the population, it may be of interest to state that out of the 306 chronic cases operated on in the last seven years, and dealt with in this paper, only nine were performed in private practice.

On inquiry, the acting superintendent of the Royal Infirmary informed us that probably about 80 per cent. of the population of Edinburgh and the South-east of Scotland (from which the infirmary mainly draws its clientèle) would come to charitable institutions such as the Royal Infirmary for operations like the radical mastoid operation. According to this calculation 20 per cent. of the cases, instead of 3 per cent., should have been operated on as private patients. It would thus appear that chronic suppurative otitis media is not only absolutely but also relatively more common among the poorer sections of the community than among the more wealthy.

If cases of severe acute suppurative otitis media were properly treated when they arise—e.g., in fever hospitals, there would be very little chronic middle-ear suppuration and consequently the radical mastoid operation would seldom be called for. Unfortunately Public Health Authorities have so far turned a deaf ear to the remonstrances of otologists in the matter. At the Seventeenth International Congress of Medicine in 1913, the Sections of Laryngology and Otology unanimously carried the following resolution: "That it would be greatly to the advantage of the community if experts in otology and laryngology were attached to the special hospitals for the treatment of epidemic diseases." The resolution was subsequently handed to Dr. Herringham, the General Secretary, by Mr. Arthur Cheatle and Mr. Sydney Scott, and by him transmitted to the Permanent Committee of the International Congress.

Duration.—According to the statements of the patients, this varied from five months to twenty or thirty years. Here again patients' statements are unreliable—e.g., several have said that one ear has only been discharging for two or three weeks and deny that the other ear has ever discharged at all, and yet examination showed the results of old suppurative otitis media on the latter side.

Nose.—In 47 cases the condition of the nose was not noted. Of the remaining 191 cases, 63 were normal; 2 showed a dry perforation of the septum; 59 deviation of the septum; 29 acute or chronic nasal catarrh; 28 hypertrophic rhinitis and 6 atrophic rhinitis. One patient had nasal polypi and three suffered from maxillary antrum suppuration. Several of the patients who had deviation of the septum also had nasal catarrh or hypertrophic rhinitis. We have not systematically examined the maxillary antrum and other nasal sinuses in cases of chronic middle-ear suppuration at the time of the radical mastoid operation, but we are surprised to note that Bodkin[1] finds that the antrum is infected in 93 per cent. of cases and that one or both antra are full of pus in 16 per cent.

Pharynx.—In 55 cases the condition of the pharynx was not noted. In the remaining 183 the conditions were as follows: Normal, 87; slight adenoids, 21; enlarged tonsils, 25; enlarged tonsils and adenoids, 47 (24 of these had tonsils and adenoids operated upon before the radical mastoid operation). Three patients showed pharyngitis sicca.

Condition of Meatus and Membrane on Operated Side.—In 125 of the 248 operated ears the condition of the membrane could not be seen on account of the presence of a polypus. In ten cases the meatus was so full of cholesteatoma, and so narrow in eight others that the membrane could not be inspected. One case showed hyperostosis of the meatus with a perforation in the lower part of the drumhead. Of the remaining 109 operated ears, 30 showed central or anterior perforations; 12 almost entire absence of the drumheads; 35 posterior perforations, and 22 attic perforations. Five cases showed more than one perforation. In only 48 cases was cholesteatoma diagnosed before operation, though at operation it was found in 104. Twelve cases showed mastoid swelling or abscess and three a sinus over the mastoid. Eight patients had previously had Schwartze operations performed on the same side. Six patients had radical operations performed once: one patient had the radical operation performed six times and two others eight times on the same side before coming to the Royal Infirmary.

Condition of Meatus and Membrane on Non-operated Side.—Of the 228 unoperated ears the condition of thirteen was not noted. Normal, 52; evidence of Eustachian obstruction, 34; acute suppurative otitis media, 2; chronic suppurative otitis media, 36; chronic suppurative otitis media with polypus or granulations, 12; attic perforations with granulations, 2. In 70 cases the membrane showed results of chronic suppurative otitis media; six had previously had mastoid operations performed on this side and one other case had also a labyrinth operation performed on this side.

Hearing before Operation.—In testing the hearing before operation we have found that—speaking roughly—the conversation voice is heard at about three times the distance at which the whisper is perceived. Further, when the good ear is closed with the finger, a patient hears the conversation voice at double the distance he hears it at when the noise apparatus is placed in the good ear. In sixteen of the patients the hearing was not tested—usually on account of the age of the patients; three other patients were deaf-mutes. Of the remaining 219 cases the hearing was bad in 68 (C.V. at 6 in. or less); moderate in 131 (C.V. at 6 in. to 6 ft.); good in 20 (C.V. at 6 ft. or over).

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[1] *Journ. Laryngol.*, 1918, xxxiii, p. 200.

Vestibular Apparatus.—This was tested in 206 cases. In the others it was omitted usually on account of the age of the patient. In cases with a large polypus occluding the meatus, only the rotation test was as a rule carried out. Twelve cases showed slight spontaneous nystagmus and one of these swayed slightly on Romberg's test. One patient showed a spontaneous pointing error. Four patients showed a fistula symptom, though in none of the four was a fistula found at operation. Normal rotation or caloric nystagmus was present in 140 cases. In 58 cases the reaction to the cold caloric test was delayed (in 10 of these cholesteatoma was present and in 28 the external meatus was blocked by a polypus). In four cases, one of them a deaf mute, there was no reaction to either test (none of these are included in the section on labyrinthitis).

Indications for Operation.—In several of the cases operated upon, one of the former clinical assistants, Dr. Andrew Campbell, had carried out intratympanic syringing according to the method employed by Siebenmann, of Basle, and Nager, of Zurich. It was found that as long as this treatment was continued the discharge was slight or absent, but soon recurred when syringing was stopped. In several of these cases the subsequent radical operation showed that the attic, aditus and antrum were lined by cholesteatoma. In many cases more than one indication for operation was present. (*a*) Chronic suppurative otitis media and failure of conservative treatment, 33 cases. In this group 4 patients complained of giddiness and 1 of sickness. (*b*) Chronic suppurative otitis media with polypi or granulations, 93 cases: 11 of these complained of giddiness, 3 of sickness, and 1 patient showed facial paralysis. We wish to ask whether, granted that the labyrinth is healthy, it is worth while to remove aural polypi on one or several occasions before proceeding to the radical mastoid operation? (*c*) Chronic suppurative otitis media with pain, mastoid tenderness and polypi, 57 cases: 9 of these complained of giddiness, 2 of sickness; 1 showed facial paralysis and 1 other showed stricture of the canal. (*d*) Chronic suppurative otitis media, acute exacerbation and subperiosteal abscess, 10 cases: in this group 1 patient complained of giddiness. (*e*) Chronic suppurative otitis media, posterior perforation, with or without cholesteatoma, 10 cases: 1 of these complained of giddiness and 1 showed facial paralysis. (*f*) Chronic suppurative otitis media, attic perforation, with or without cholesteatoma, 24 cases: in this group 6 patients complained of giddiness. (*g*) Chronic suppurative otitis media with a sinus over the mastoid, 4 cases. (*h*) Failure of previous mastoid operation, 17 cases. In group (*h*) 2 patients complained of giddiness and 1 other of sickness.

Operation.

Technique.—Since the publication of his paper on the technique of the radical operation in the *Journal of Laryngology* three years ago the operator has entirely given up the method of skin-grafting there described and has adopted Mr. Marriage's method. In order to focus discussion on the question of technique, we invite the opinion of the members on the following questions:—

(1) The value of preliminary radiograms of the mastoid processes. During the War it has not been possible to have radiograms taken of our mastoid cases owing to the absence on military service of the late Major Porter and Captain Gardiner, who were in charge of this branch of Dr. Logan Turner's department.

(2) The line of incision—retro-auricular groove or hair margin?

(3) Is it advisable to excise a crescentic piece of skin in order to brace the auricle up and back?

(4) Hæmostasis. Is it advisable to adopt any method of local anæsthesia—e.g., Neumann's, in addition to general anæsthesia? Some American writers advocate the use of adrenalin during the course of the operation.

(5) Method of removal of bone by gouges, curettes or burrs, or by a combination of these three. Some American writers have much to say about necrotic bone found at the radical mastoid operation. In our experience real necrosis is very rare. In the walls of the cavity inflamed and softened bone is often met with, but actual necrosis and sequestrum formation almost never. Bone is very "recoverable" tissue.

(6) Methods of meatal plastic. At what period of the operation should the plastic be performed?

(7) Curettage of tympanic cavity. Use of forceps to remove granulations. Difficulty in dealing with granulations in the region of the oval

window and sinus tympani. The operator has found Milligan's labyrinth spoon of service in turning small polypi out of the latter region.

(8) Removal of floor of bony meatus. Richards[1] and Bowers[2] recommend that this removal be so complete that the hypotympanic cavity is entirely exposed to view through the enlarged external meatus.

(9) Removal of convexity on anterior wall of bony meatus. Bowers apparently exposes the capsule of the temporo-maxillary joint in some cases in removing this convexity, in order to expose the Eustachian tube for after treatment.

(10) Method of dealing with the Eustachian tube. Richards recommends removal of the processus cochleariformis and the tensor tympani so as to convert the muscular and tubal canals into one. Different types of curettes for the Eustachian tube. Is it possible to remove all mucous membrane from this region which, in many cases, includes numerous air cells? Bowers insists strongly on this point, though he admits that the internal carotid artery may be exposed. The jugular bulb also might be opened (J. S. F.). Yankauer claims that 83 per cent. of tubes can be closed by curettage with his instruments through the meatus without radical operation, and that in 50 per cent. of cases chronic suppuration is cured by this means. Longee, however, finds that only 8 per cent. are cured. Unless we succeed in closing the tube at the radical operation we have got a muco-cutaneous fistula, and any attack of naso-pharyngeal catarrh is liable to be followed by otorrhœa.

(11) Skin-grafting. Before application of the graft the operation cavity is syringed out with warm sterile saline solution. Method of application—(*a*) on gauze or worsted packing, or (*b*) by filling the cavity with lotion and pipetting all the fluid from below the graft. Is it advisable to cut a small hole in the graft so as to leave the window regions exposed? We believe that, in the presence of a normal labyrinth, the hearing power after operation depends on the integrity of the window niches and the mobility of the structures closing the windows. It would appear possible that the skin-graft might impair this mobility and also to some extent interfere with free access of air vibrations. Contra-indications to skin-grafting.

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[1] *Annals of Otology*, 1918, xxvii, p. 374.

[2] *Laryngoscope*, 1918, xxviii, p. 794.

Findings at Operation (248 *Operated Ears*).

Superficial Tissues.—Normal, 207; œdema, 2; glandular abscess, 2; subperiosteal abscess, 13; fistula, 10; scar, 14.

Mastoid Cortex.—Normal, 208; deep hollow over site of antrum, 6; cortex eroded, 5; eroded with granulations, 6; fistula, 10; old operation cavity, 13.

Mastoid Process.—Sclerotic, 174; sclero-diploëtic, 31; diploëtic, 12; cellular, 8; contained fibrous tissue, 15; fistula through posterior meatal wall, 1; entirely hollowed out by cholesteatoma, 5; Bezold's abscess, 2.

Mastoid Antrum.—Practically healthy, 50; contained only watery, brownish or blackish fluid, 14; mucus or muco-pus with swollen mucosa, 61; pus and polypoid mucosa and granulations, 57; contained cholesteatoma, 66.

Sigmoid Sinus.—In 202 cases the sinus was not exposed at operation. In 36 cases it was far forward (exposed by gouge) and found normal; in 2 cases it was exposed by gouge and appeared thickened; in 6 cases it was exposed by disease.

Aditus.—In 32 cases the aditus contained cholesteatoma; in 9 it contained granulations or polypi; in 7 the mucosa of the aditus was swollen and congested; and in 3 there was some growth of new bone.

Lateral Semicircular Canal.—The bony wall appeared thin and eroded, but showed no actual fistula in 8 cases; 1 of these cases showed the fistula symptom; 1 case (previously operated upon) showed new bone formation in the region of the lateral canal.

Ossicles (*Malleus and Incus*).—Under the conditions in which the radical mastoid operation is performed it is not possible to speak with certainty as to the condition of the ossicles in every case. After the bridge has been removed there is often so much bleeding that, even with the most careful swabbing, it is not humanly possible to observe in every case whether the incus and malleus are present. For this reason we do not wish to be dogmatic as to our findings, but with this reservation the following statement may be made: Both ossicles healthy, 74; malleus healthy but incus diseased (usually long process of incus eroded or absent), 74; malleus eroded and incus gone, 12; malleus and long process of incus eroded, 1; head of malleus eroded or absent and incus absent, 21; handle of malleus eroded and long process of incus gone, 2; handle of malleus eroded, incus healthy, 3; malleus and incus ankylosed, 6; ossicles absent or not found, 55.

Attic.—In 7 cases the attic showed swollen or polypoid mucosa: in 5 it contained granulations; in 53 cases there was cholesteatoma in the attic; in 1 case the attic was partly filled by new bone formation; in 1 case there was a small hole in the tegmen tympani; in 2 cases the facial canal was eroded.

Tympanum.—A note was made of the condition of the tympanum in 156 cases as follows: Swollen or polypoid mucosa, 28; granulations in tympanum, 44; polypus growing from promontory, 69; polypus from attic, 3; cholesteatoma in tympanum, 11; oval window filled by new bone formation, 1.

Tube.—In 246 of the 248 ears the tube was curetted; in 2 cases it was not curetted as it appeared to have been closed by a previous operation; in 9 cases the tube was curetted and touched with chromic acid; in 24 it was curetted and cauterized with the electro-cautery: 5 of this latter group did not report after operation; of the remaining 19 the cavity was satisfactory in 12, though 6 of the 12 required attention; in 2 the cavity was moist; in 5 the tube was open.

Flap.—With regard to the flap, the operator continues to be satisfied with the results of the Koerner flap, which has been used in practically all cases.

Skin-graft.—Mr. Marriage's method of skin-grafting was adopted by the operator in June, 1916, and since that time 83 of the operations recorded in this paper have have been performed. Of these, however, only 70 have been skin-grafted. The remaining 13 were not grafted for the following reasons: (1) The presence of fistula symptom, 2 cases: in one of these the canal prominence proved normal but the stapes was probably loose; in the second case the bony wall of the canal looked thin. (2) Canal eroded, 1 case. (3) Exposure of the dura mater of the middle fossa, 4 cases. (4) Exposure of the middle fossa, giddiness and abnormality of the canal prominence, 4 cases. (5) Sigmoid sinus exposed by disease and lateral canal eroded, 2 cases.

Progress.—Of the 238 patients 163 made uneventful recoveries. Seven cases had stitch abscesses. In 19 cases the posterior wound suppurated. In 3 cases the graft came away. Eleven had slight fever after operation, 13 had spontaneous nystagmus to the non-operated side, 7 suffered from giddiness and nystagmus, 6 suffered from sickness and vomiting. Five patients after operation developed scarlet fever. The operator is of opinion that this "scarlatina" is, at any rate in some cases, a form of mild streptococcal septicæmia resulting from the operation—i.e., it is not caught from another case of scarlatina in the usual way. One case developed erysipelas. Two cases showed slight swelling of the auricle and three developed perichondritis. There was no case of post-operative facial paralysis (i.e., paralysis present on the day after operation), but five patients developed facial paresis from five days to a week after operation: this trouble soon cleared up. One of the two patients who showed facial paralysis before operation was quite cured afterwards. Two patients developed purulent labyrinthitis after the mastoid operation and had double vestibulotomy performed. Both recovered. These two cases are dealt dealt with in the section on labyrinthitis. The two fatalities were as follows:—

(1) K. W., female, aged 44, suffered from chronic suppurative otitis media and aural polypi, bilateral. Labyrinths healthy. First operation (radical mastoid on left side): Pus and granulations, with necrosis of ossicles, skin-graft applied, aural polypus removed from right ear. Operated ear did well but discharge from right ear continued. Later, radical operation on right ear showed similar conditions to those on left side, sinus exposed with gouge but appeared normal, skin-graft applied. Temperature rose continuously for three days after operation and patient had a rigor. Stitches removed and also skin-graft. Patient developed a cough and blood-stained expectoration; blood culture showed streptococcus. Intravenous injection of eusol given. Death. Post-mortem: Old pleural adhesions, empyema of right side, large infarct in lower lobe of right lung. Cerebral sinuses showed no thrombosis.

(2) R. S., male, aged 5, suffered from chronic suppurative otitis media, with acute mastoid exacerbation, enlarged tonsils and adenoids. Radical mastoid operation: Cholesteatoma present. Child fell out of bed on the day following operation and afterwards became unconscious. Operation wound opened up but nothing abnormal found. Lumbar puncture yielded clear fluid under normal tension. Death on evening following operation. Post-mortem refused. Cause of death uncertain—Status lymphaticus? Septicæmia? Acidosis?

Mortality.—Mr. Heath claims a mortality of 1 in 360 and Mr. Adair Dighton of 1 in 54 for the modified radical operation. Mr. Dighton[1] writes as follows: "In the chronic cases the risk to life in a Heath's operation is practically *nil*, whereas the radical mastoid operation boasts a death-rate of at least 16 per cent. in these cases (Report of Ear Department, Royal Infirmary, Edinburgh, March, 1912)." We hold that this statement is calculated to give an entirely erroneous impression. If Mr. Heath and his followers intend only to plead for early operation in cases of middle-ear suppuration, which do not yield to more conservative measures, few will be found to disagree. If, on the other hand, they wish to indicate that the modified radical operation is safe, whereas the radical mastoid operation is dangerous, we hold that they are misleading the medical profession. They must distinguish between the radical operation as performed in cases of middle-ear suppuration alone and the same procedure when carried out *en route* to the relief of labyrinthine and intracranial complications already present when the patient is admitted. In the first case the radical operation according to our statistics in this paper has a death rate of 2 in 238 cases or, if the 52 cases previously reported be included, of 2 in 290 cases. In the second case the mortality is admittedly severe but the fatalities cannot in fairness be attributed to the radical operation. If a patient with extrinsic cancer of the larynx has a preliminary tracheotomy followed by excision of the larynx, we do not attribute his death, should it occur, to the former procedure.

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[1] "A Manual of Diseases of the Nasopharynx," p. 126, London, 1912, Balliere, Tindall and Cox.

After-treatment.—It is almost superfluous to go back to the methods of after-treatment adopted before the days of skin-grafting, according to Mr. Marriage's method. The writers have no experience of the Carrel-Dakin method, which seems to be associated with special difficulty in the after-treatment of the radical mastoid operation. French writers have recommended ambrine—a form of paraffin which is poured into the cavity and in which a wick of gauze is implanted to facilitate removal. This treatment is begun from the fifth to eighth day after operation and is continued for fifteen or twenty days. Guisez recommends Vincent's powder (one part calcium hypochlorite to nine parts of boric acid), but again we have no experience of this method. Our own practice in cases which have been skin-grafted is to pack the cavity with iodoform worsted at the time of operation and to leave the wound alone for five days. At the end of this time the stitches are removed including that retaining the meatal flap. The iodoform worsted packing is also removed and the cavity mopped out with sterile gauze. The cavity is then repacked for a further period of two days with iodoform worsted and the dressings reapplied. Thereafter no further packing is employed and the case is treated by means of syringing until the superficial layers of the graft come away and a dry cavity has, if possible, been obtained. The meatus is left open in the daytime but at night a piece of iodoform gauze is inserted, though the cavity itself is not packed.

The progress of the case after operation appears to depend to a considerable extent upon the general condition of the patient. The operator has noticed that the cases dealt with at the Edinburgh War Hospital, Bangour, have made better recoveries than those in the Royal Infirmary, and attributes this fact to the better physique and general health of the patients in the former institution.

Stay in Hospital.—The average duration of the stay in hospital after operation was twenty-two days. We have often felt that it is rather a waste of hospital space and of nursing skill to keep patients in hospital for several weeks after the radical mastoid operation. If the patient lives in town the question is easily settled, because he can come up once or twice a day for treatment. If, on the other hand, he lives in the country, the question is more difficult. If we send such a patient home we have to entrust the after-treatment to a relation or friend who most probably has had no experience of ear work. The patient's doctor, even if he knows anything about after-treatment, cannot afford the necessary time. We have often thought that it would be a good thing if, instead of retaining these patients in hospital, some less elaborate and expensive form of lodging could be provided for country cases which require attention once or twice daily.

After-care of the Operated Ear.—Even after the case has apparently made a satisfactory recovery and the cavity has been completely lined with epithelium, some attention is necessary if things are to remain satisfactory. It is our experience that unless the operation cavity is treated at regular intervals by means of peroxide drops and syringing with lukewarm soda solution, drying, and the installation of spirit and boric acid drops, wax and epithelium accumulate so that in time the cavity becomes filled with putty-like material in which there is some pus. Printed instructions are now given to all "radical mastoid" patients on leaving hospital, but it is the exception to find that these instructions have been followed. As a rule the patients confess, when they report for inspection, that nothing has been done to their ears since they left the infirmary. In many cases the auricle and mastoid region are not even washed with soap and water.

Results.

We have found that accounts given by patients concerning the condition of their ears after operation are quite untrustworthy. When they returned to report some patients stated that their ears were quite dry and yet examination showed that discharge was still present. Others told us that their ears were still discharging, though inspection proved that they were quite dry. We accordingly decided not to send out a questionnaire and to depend only on personal examination of our operated ears. Sixty-three per cent. of the cases reported when written for. This is fairly satisfactory considering the difficulty and expense of travel in recent times.

The main point brought out by the examination of the patients who reported was that the persistence of Eustachian catarrh or suppuration is the main source of failure after the radical mastoid operation. We have not as yet found an efficient method of closing the Eustachian tube. The radical operation does appear, however, to free the patient from the danger of an intracranial complication. We know of no case in which such a complication has arisen after the radical mastoid operation has been performed. Dr. Logan Turner tells us that this is also his experience.

Results in the Non-skin-grafted Cases (171) *reported on by Dr. Garretson.*—Of 171 patients, 107 presented themselves for inspection at periods of from three months to five years after operation. Three of these 107 were patients who had had both ears operated upon, so that 110 of the 178 operated ears were seen. Of these, 37 appeared to be cured, while 10 others were very satisfactory except that they showed want of care (an accumulation of wax and desquamated epithelium). This gives 43 per cent. of cures. In 24 cases the inner wall of the cavity was moist, but there was no pus. There was still some purulent discharge in 27 cases. In 1 case the cavity was filled with cholesteatoma. In 3 cases a false membrane had formed, almost shutting off the deeper part of the cavity. In 4 cases there were granulations in the operation cavity. Three cases showed a permanent opening behind the ear. One showed a keloid in the mastoid scar and a large amount of débris in the cavity.

Hearing after Operation.—This was tested in 93 cases, as follows: Hearing improved, 35; the same, 36; worse, 22.

Results in the Skin-grafted Cases (reported on by J. S. F.).—Of the 67 patients, 44 presented themselves for inspection at periods of from three months to two and a half years after operation. Two of these were patients who had had both ears operated upon, so that 46 of the 70 operated ears were seen. Of these, 20 appeared to be cured, and 12 others were quite satisfactory except that they showed want of care (70 per cent. cures). In 7 cases the inner wall was red and moist. Four cases still had slight purulent discharge, and one other had foul-smelling profuse discharge. Two cases showed membrane formation with a narrow opening into it through which pus came when the patient performed Valsalva's experiment.

Hearing after Operation.—This was tested in 42 cases, with the following results: Improved, 12; as before operation, 16; worse, 6.

Bowers[1] reports on 107 cases, 84 of which presented themselves for re-examination: 63 of these were dry (75 per cent. cures). The hearing was improved in 60 per cent., remained the same in 34 per cent., and was worse in 6 per cent. There were no deaths, but one partial facial paralysis.

Stucky[2] reports on 100 cases with 89 dry ears. In the remaining 11 the tube was open and there was recurrent mucoid discharge. The hearing was improved in 19, remained the same in 60, and was worse in 21 cases.

Morissette Smith[3] showed 10 consecutive cases with dry ears. The hearing was improved in 7 and remained the same in 3.

Dench has recorded 734 cases, with no death. He would be ashamed to show only 50 per cent. of cures.[4]

Richards, in discussing Dench's paper, also holds that 50 per cent. of cures is a bad result and is due to inefficient operating. Speaking from memory, we believe that Dench and Richards claim from 70 to 80, or even 85 per cent. of cures.

On the other hand, Harris[5] states that he has examined 24 cases operated upon by other American otologists, and of these 48 per cent. were dry and 52 per cent. were still discharging. The hearing was improved in 8 per cent., remained the same in 20 per cent., and was worse in 20 per cent.

In the previous paper published by the operator and Captain Milne Dickie it was noted that 26 of the 52 "radical" cases reported. Of these, 17 were dry—i.e., 65 per cent. The hearing was tested in 22 cases, of which 15 were improved, 4 were the same, and 3 worse.

It is needless to point out the divergence between the results claimed by Dench, Richards, Smith, Bowers, and Stucky on the one hand, and those reported by Harris on the other. The writers are disposed to believe that the statements of Harris more nearly represent the results obtained by the majority of operators than do those reported by the group of otologists mentioned above.

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[1] *Laryngoscope*, 1918, xxviii, p. 803.

[2] *South. Med. Journ.*, 1917, x, p. 511.

[3] *Annals of Otol.*, 1918, xxvii, p. 374.

[4] *Annals of Otol.*, 1917, xxvi, p. 202.

[5] *New York State Med. Journ.*, 1917, xvii, p. 17.

We have attempted to associate the appearances present on otoscopy with the state of the hearing, conditions found at and the result obtained by operation. The cases have been divided into the following groups:—

(1) Central perforations, 20 cases. Hearing before operation: Not tested, 20 per cent.; good or moderate, 83 per cent.; bad, 17 per cent. In 30 per cent. of these the antrum was almost healthy, in 35 per cent. the antrum centained muco-pus or the mucosa was swollen, in 25 per cent. it contained pus, in 10 per cent. the antrum contained cholesteatoma. It will thus be seen that in this group there was little disease in the posterior part of the middle-ear cleft. With regard to result, in 35·5 per cent. cases the cavity was moist and in 21·3 per cent. the result was poor. In 42·6 per cent. the result was good. Hearing after operation: Improved, 42·6 per cent.; the same, 28·4 per cent.; worse, 28·4 per cent.

(2) In the second group the external meatus was partially or completely occluded by a polypus, but cholesteatoma was not present. These cases numbered 84. Hearing before operation: Good, 4·16 per cent.; moderate, 63·2 per cent.; bad, 30·2 per cent.; not tested, 1·4 per cent. In 33·7 per cent. there was little or no disease in the antrum; in 30 per cent. the antrum contained muco-pus or the walls were swollen and congested; in 30 per cent. the antrum contained pus or granulation tissue. With regard to result, in 38 per cent. the cavity was moist and in 12 per cent. the result was poor. The result was quite satisfactory in 50 per cent. Hearing after operation: Improved, 46 per cent.; the same, 38 per cent.; worse, 16 per cent.

(3) The third group consists of those cases with polypus or granulations in which cholesteatoma was either diagnosed before operation or found at operation. It was not possible in these cases to state with certainty the position of the perforation. This group numbered 32 cases. Hearing before operation: Good or moderate, 47 per cent.; bad, 30 per cent.; not tested, 23 per cent. In 94 per cent. there was cholesteatoma in the antrum and in the remaining 6 per cent. there was only cholesteatoma in the attic or aditus. In this group 43 per cent. showed a satisfactory result, in 52 per cent. the cavity was still moist, in 5 per cent. the result was poor. Hearing after operation: Improved, 43 per cent.; the same, 43 per cent.; worse, 14 per cent.

(4) The fourth group consists of those in which there was a posterior marginal perforation. These cases numbered 33. Hearing before operation: Good or moderate, 67 per cent.; bad, 27 per

cent.; not tested, 6 per cent. In 33 per cent. of the cases the antrum was practically healthy, in 33 per cent. the antrum contained muco-pus or the mucosa was swollen, in 15 per cent. it contained pus, in 20 per cent. there was cholesteatoma in the antrum. It will thus be seen that on the whole the antrum does not show serious disease in these cases. On the other hand there was cholesteatoma in the neighbourhood of the round window, extending up towards the attic and aditus in six of the cases. The final result in these cases was good as a rule. In 64 per cent. the result was good, in 33 per cent. the cavity was moist, in 3 per cent. the result was poor. Hearing after operation: Improved, 53 per cent.; the same, 18 per cent.; worse, 29 per cent.

(5) The fifth group are those with attic perforations. This group numbered 30 cases. Hearing before operation: Good or moderate, 80 per cent.; bad, 20 per cent. In 96 per cent. cholesteatoma was present in the attic, though in 30 per cent. the cholesteatoma did not extend as far back as the antrum. In the remaining 4 per cent. the antrum contained only muco-pus and no cholesteatoma was found. With regard to result, 75 per cent. were satisfactory and 25 per cent. still had moist cavities. Hearing after operation: Improved, 14 per cent.; the same, 36 per cent.; worse, 50 per cent.

(6) In 19 cases there was more than one perforation or there was total absence of the tympanic membrane and ossicles. Hearing before operation: Moderate, 37 per cent.; bad, 47 per cent.; not tested, 16 per cent. In 10 per cent. of the cases the antrum was healthy, in 10 per cent. it contained pus, and in 80 per cent. it contained cholesteatoma. In 42 per cent. the result was satisfactory, in 33 per cent. the cavity was moist, in 25 per cent. the result was poor. Hearing after operation: Improved, 55 per cent.; the same, 45 per cent.

MODIFIED RADICAL OPERATIONS.

Sex.—Of the 17 cases, 10 were males and 7 were females.

Age (in decades).—1 to 9 years, 1; 10 to 19, 3; 20 to 29, 8; 30 to 39, 2; 40 to 49, 2; 50 to 59, 1. Average age, 26 years.

Residence.—Edinburgh and district, 11; country, 6.

Side.—Right, 10; left, 7.

Cause.—This was stated in 6 of the 17 cases, as follows: Scarlet fever, 1; measles, 3; teething, 1; mill accident, 1.

Duration.—As in radical operations.

Nose.—In five cases there was no note of the condition of the nose. Of the other 12 cases 4 were normal, 3 showed deviation of the septum, 1 showed hypertrophic nasal catarrh, and 3 showed both deviation of the septum and hypertrophic catarrh ; 1 case had nasal polypi.

Pharynx.—In 4 cases the condition of the pharynx was not noted. Of the remaining 13 cases, 10 were normal and 3 had enlarged tonsils and adenoids.

Condition of Meatus and Membrane on Operated Side.—In two of the 17 cases the condition of the membrane could not be seen on account of the presence of a polypus. In 3 others the membrane could not be seen ; in 2, owing to sagging of the meatal wall and in the other owing to meatal stenosis. Of the remaining 12 cases 1 showed central perforation, 5 showed posterior perforations, and 5 showed attic perforations ; 1 showed a posterior and also an attic perforation.

Condition of Meatus and Membrane on Non-operated Side.—Normal, 3 ; evidence of Eustachian obstruction, 7 ; chronic suppurative otitis media, 1 ; results of chronic suppurative otitis media, 5 ; meatus narrowed after an injury, 1.

Hearing before Operation.—Good, 10 ; moderate, 6 ; not tested, 1.

Vestibular Apparatus.—This was tested in 15 of the 17 cases ; 14 cases showed normal reaction to caloric or rotation tests ; the remaining case showed spontaneous nystagmus to the operated side and a well marked fistula symptom on the operated side.

Indications for Operation.—What are the indications for the modified radical operation in cases of chronic middle-ear suppuration ? Kaufman[1] states that the operation is indicated in cases of disease confined to the antrum and mastoid in which the ossicles are in place. It is difficult to know, however, how he ascertains these data. It is usually considered that Heath's operation is indicated in cases with good hearing. In our experience such cases belong to one of two groups : (1) Cases with "central" perforation in the lower or anterior portion of the drumhead and with a muco-purulent discharge. These cases are really tubo-tympanic suppurations in which the upper and posterior portions of the middle-ear cleft (attic, aditus and antrum) are not seriously involved. We believe that it is useless to open the mastoid antrum in such cases according to Mr. Heath's method. Even the radical operation itself with curettage of the Eustachian tube too often fails to stop the discharge. We believe that the best treatment for this group consists in (*a*) attention to the nose and nasopharynx, especially the removal of a large " posterior end," operation for tonsils and adenoids, &c. (*b*) Syringing the Eustachian tube through the Eustachian catheter. (*c*) Syringing the tube by means of an ordinary metal ear syringe with an olivary end which tightly fits the meatus. The fluid passes down the tube and returns by the nose. Argyrol can be applied to the tube by these two methods. (*d*) Vaccine therapy.

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[1] *Annals of Otology*, 1917, xxvi, p. 543.

(2) The second group in which hearing is often good consists of cases with attic perforations. In these cholesteatoma is almost invariably present, and we understand that Mr. Heath at one time regarded cholesteatoma as a contra-indication to his operation. If this is still so, we cannot agree with Mr. Heath's view for we have operated on several cases of attic perforation with cholesteatoma in which a modified operation yielded a perfectly dry ear with the retention of excellent hearing. In these cases the external wall of the aditus and attic were removed, but the lower portion of the drumhead along with the ossicles were not touched.

(3) The only remaining group of chronic middle-ear suppuration is that in which there is a perforation in the posterior portion of the drumhead extending to the margin. In many of these an aural polypus is also present. We have found that in the majority of these cases the long process of the incus is absent so that the continuity of the ossicular chain is broken. The hearing is often poor, but if it is good the modified radical operation should be performed.

Our usual indication for the modified radical in preference to the radical operation was the retention of (1) good hearing in the operated ear, or (2) moderate hearing when the other ear was distinctly deaf.

Technique.—As in the radical operation up to the point at which the inner end of the bridge remains. Koerner's flap is then cut and any polypus in the meatus removed with forceps. If an attic perforation is present the inner end of the bridge with the outer attic wall is removed. Special care is necessary to get away all bone chips. Marriage's skin-graft is applied to the antrum in the majority of cases.

Operation.

Superficial Tissues.—Normal, 13; scar from accident, 1; scar from old operation, 1; subperiosteal abscess, 2.

Mastoid Cortex.—Normal, 14; eroded, 2; old operation cavity, 1.

Mastoid Process.—Sclerotic, 11; cellular, 5; scar tissue, 1.

Mastoid Antrum.—Healthy, 3; contained only watery, brownish or blackish fluid, 2; mucus or muco-pus with swollen mucosa, 6; pus and polypoid mucosa and granulations, 3; contained cholesteatoma, 3.

Sigmoid Sinus.—In 5 cases the sinus was far forward (exposed by gouge) and found normal. In no case was it exposed by disease.

Progress.—Of the 17 patients, 9 made uneventful recoveries. Two cases had stitch abscesses. In two cases the posterior wounds suppurated slightly. One patient had slight nystagmus to opposite side and another had rotatory and lateral nystagmus to the affected side on the day following operation. One patient had slight fever and some swelling of the auricle, but no redness, and the condition soon cleared up.

Results.

Twelve of the 17 patients reported after operation. Of these, 9 were quite satisfactory. In 3 cases the cavity was still moist.

Hearing after Operation.—This was tested in 12 cases as follows: Improved, 10; as before operation, 1; worse, 1.

We have attempted to associate the appearances present on otoscopy with the state of the hearing, the conditions found at and the result obtained by operation. The cases have been divided into the following groups:—

(1) There was a central perforation in 1 case, with moderate hearing, and the antrum contained only mucus. The meatus was still moist five months after operation.

(2) In 5 cases the perforation was in the posterior superior part, and in 3 of these a polypus was also present. In 3 of the 5 the hearing before operation was good and in 2 moderate. The antrum was practically healthy in 1 case. In a second it contained only brownish fluid. The third contained muco-pus. In the fourth there was pus and polypoid mucosa, and in the fifth cholesteatoma. The result is known in 4 of the cases, and in all of these the ear was dry. The hearing was improved in 2 and remained the same in 1 case.

(3) An attic perforation was present in 6 cases, in 2 of these combined with the presence of polypus or granulations. The hearing was good in 4 of the 6 cases and moderate in the remaining 2. The antrum was healthy in 1 case but the attic contained cholesteatoma. The antrum contained discoloured fluid in 1 case. In 2 the antrum contained muco-pus and in 2 cholesteatoma. The result is not known in 2 cases. The ear remained moist in 2 cases while in the remaining 2 the ear was dry. Of the 4 cases who reported, the hearing was improved in 2 cases, remained the same in 1, and was worse in 1.

(4) In 1 case the meatus was stenosed, so that the position of the perforation was not ascertained. Hearing was moderate. The antrum was healthy. The result as regards condition of the cavity was excellent and the hearing improved.

(5) In 2 cases there was sagging of the posterior superior wall of the meatus, preventing inspection of the membrane. In 1 of these hearing was good and in the other moderate. In both cases the antrum contained pus and polypoid mucosa. One case did not report but in the other the ear was dry and the hearing improved.

(6) In the 2 remaining cases the meatus was occluded by a polypus and the position of the perforation not ascertained. In 1 of these the hearing was good and in the other moderate. In both, the antrum contained only muco-pus. One patient did not report but in the other the result was good and the hearing improved.

LABYRINTH CASES.

The labyrinth cases numbered 26, 16 of whom were males and 10 females. The age of the patients varied from 5 to 53 years, as a rule between 20 and 30. It is notable that the average age (25) was considerably more than the average age (19) of the intracranial cases. Eleven of the patients resided in Edinburgh or its neighbourhood and 15 came from the country. Cholesteatoma was present in 13 of the 26 cases; granulations and polypi in 21 cases. In 3 cases there was an attic perforation and in 2 cases a posterior marginal perforation could be seen. A subperiosteal abscess was present in 5 cases and facial paralysis before operation in 3.

Symptoms.—Pain in the ear or head, 18 cases; fever in only 2 cases; giddiness, 16 cases; vomiting, 8 cases. Noises in the head formed a marked symptom in 1 case and were so bad that the patient insisted on operation.

Hearing.—Not tested in 2 cases owing to the age of the patients. In none of the remaining 24 cases was the hearing good. Moderate hearing (C.V. at from 6 in. to 6 ft.) was present in 7 (all of circumscribed labyrinthitis), and bad hearing (C.V. at less than 6 in.) in 5 cases. Total deafness in 12 cases.

Vestibular Symptoms.—Spontaneous nystagmus, 8 cases; pointing error, 2 cases; fistula symptom present in only 2 instances, although there were 12 cases of circumscribed labyrinthitis. Rotation nystagmus was normal in only 3 of the cases, while it was reduced in 11. In the others it was not tested. Caloric nystagmus was not obtained in 13 cases in which it was examined for. Many of these, however, had cholesteatoma and polypus. Caloric nystagmus was present in 9 cases of circumscribed labyrinthitis.

Type of Labyrinthitis, Operation Performed, and Result.

(*a*) Of the 26 patients, 12 were cases of circumscribed labyrinthitis. In 10 of these the radical mastoid operation only was performed, and 3 of them were skin-grafted. All of the patients recovered. In 4 of the 10 the hearing was improved, in 3 the hearing remained the same, in 3 the hearing was not tested after operation. In one of the remaining cases double vestibulotomy was performed in addition to the radical mastoid operation. The patient recovered but had no hearing on the operated side. In the last case Neumann's labyrinth operation was performed in addition to the radical mastoid operation. This patient recovered, but was also deaf on the operated side.

(*b*) Diffuse purulent labyrinthitis (manifest)—3 cases—following the radical mastoid operation. In 2 of these a fistula was present in the lateral canal at the time of the radical operation. In 1 case the radical mastoid operation alone was performed. The patient recovered with loss of hearing. In 2 cases double vestibulotomy was done when the patients developed labyrinth suppuration. Both patients recovered, with loss of hearing.

(*c*) Latent labyrinth suppuration, 8 cases ; in 6 of the 8 cases the radical mastoid operation and double vestibulotomy were performed. All 6 patients recovered, but with total loss of hearing. In 2 cases the radical mastoid operation, plus Neumann's operation, was performed. One of these patients recovered and 1 died. This latter case was one in which there was a fistula into the cochlea discovered at operation. The semicircular canals, however, were filled up by new bone formation.

Neumann's operation was followed by meningitis. Microscopic examination of the ear showed that the posterior part of the labyrinth had become a solid mass of bone, while the cochlea still showed granulation tissue and abscess formation.

(*d*) Spontaneous cure of labyrinth suppuration, 2 cases. In both of these the radical mastoid operation only was performed. Both patients recovered.

The other fatal case was that of the patient already mentioned who suffered from chronic middle-ear suppuration, with noises in the ear which were so intense that she stated she would go mad if operation were not performed. No labyrinthine lesion was obvious at the time of the radical operation, which was immediately followed by double vestibulotomy and removal of the cochlea. In this case it would certainly have been better if the radical operation had been performed first of all, so as to obtain, if possible, a dry ear, before proceeding to removal of the cochlea. The operator's hand, however, was forced by the attitude of the patient in this case.

INTRACRANIAL COMPLICATIONS.

These cases numbered 25, of whom 17 were males and 8 were females. The average age was 19 years. All the patients were under 30 years of age.

The Edinburgh Royal Infirmary draws from a very large area, including Fifeshire, the Lothians and the border counties. In fact the majority of the patients dealt with in this report came from districts outside Edinburgh and Leith. Fifteen of the 26 labyrinthine and 17 of the 25 intracranial cases came from the country. Many of the cases with intracranial complications were not sent in for several days or even for one or two weeks after grave symptoms had developed. For this reason it is not surprising that there is a considerable mortality associated with operations for the relief of intracranial lesions. Up till comparatively recently the course on "diseases of the nose, ear and throat" has not been compulsory, and many general practitioners fail to realize the serious nature of symptoms arising as a result of middle-ear suppuration. The majority of practitioners have now learnt to send in to hospital without delay cases of appendicitis, strangulated hernia or ruptured gastric or duodenal ulceration, but they still retain cases of suppurative otitis media associated with headache, vomiting, giddiness, rigors, &c., and treat them by means of sedative powders or counter irritation.

In 8 of the intracranial cases there was delay in operation. As a rule this was the fault of the patient or his friends, who refused operation, but in one or two cases the intracranial complication occurred between the time at which the patient was first seen (when no urgent symptoms were present) and that at which there was a vacant bed ready in the department. Such occurrences are almost bound to happen in the presence of a long "waiting list." Four of these 8 cases ended fatally. Cholesteatoma was present in 18 of the 25 cases. *In most instances more than one intracranial complication was present.*

(1) *Extradural Abscess.*—Seventeen cases, 8 recoveries and 9 deaths. A perisinus abscess was present in 15 cases, and an extradural abscess in the middle fossa in 1 case. In 1 case both perisinus and middle fossa abscesses were present.

(2) *Labyrinthitis.*—Seven cases associated with intracranial complications and not included in previous part. (*a*) Circumscribed labyrinthitis, 3 cases, 1 recovery and 2 deaths. Of the 2 fatal cases 1 had sinus thrombosis and the other had purulent meningitis. (*b*) Diffuse labyrinthitis, 1 case, recovery. (*c*) Latent labyrinthitis, 3 cases, 1 recovery and 2 deaths. Of the 2 fatal cases 1 had sigmoid sinus thrombosis and meningitis, and the other had cerebellar abscess.

(3) *Sigmoid Sinus Thrombosis.*—Twelve cases, 6 recoveries and 6 deaths. In 3 of the 6 fatal cases purulent leptomeningitis was already present on admission to hospital and 1 other developed purulent leptomeningitis after admission.

(4) *Temporo-sphenoidal Abscess.*—Four cases, 1 recovery and 3 deaths. In 2 of the 3 fatal cases rupture into the lateral ventricle had occurred before the admission of the patient to hospital. In the remaining case rupture occurred after admission.

(5) *Cerebellar Abscess.*—Three cases, 2 recoveries and 1 death. The death occurred from septic œdema of the brain, spreading from the walls of the abscess.

(6) *Leptomeningitis.*—Thirteen cases. (*a*) Serous meningitis, 3 cases, all recovered. (*b*) Purulent meningitis, 10 cases, 1 recovery and 9 deaths. In all the fatal cases other complications were present, as follows: Circumscribed labyrinthitis, 1; latent labyrinthitis, 1; sigmoid sinus thrombosis, 4; temporo-sphenoidal abscess, 3.

Summary.—Of the 25 cases 13 recovered and 12 died.[1]

DISCUSSION.

Mr. ARTHUR CHEATLE: This paper opens up an enormous field for discussion. I would like to draw special attention to the public health question raised by the authors. There was the recommendation passed by the Otological Section at the last International Congress, and of which no notice has been taken, and the authors think that the actual conditions found by recruits and soldiers during the War may egg the authorities to action. We are all aware of the loss of man power and money owing to ear troubles during the War, and pensions therefor will have to be paid for many years to come. It is not as if the Government had not received a warning in this respect, for in 1902

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[1] This paper is to appear subsequently in the *Journal of Laryngology, Rhinology and Otology*, with details of all fatal cases and of all intracranial cases whether fatal or not.

I presented a report on an examination of the ears, nose and throat of 1,000 poor school children to the Otological Society of the United Kingdom. Among other things it was found that eighty-eight of the children were suffering from chronic middle-ear suppuration. A committee was appointed to consider the subject, and a report was sent to the Board of Education pointing out the large amount of preventable and curable ear disease among the children of the poorer classes, and how such disease "tends to considerable loss of hearing, health and life; that it militates against a child's education, and that later on the subjects of it are seriously hampered in their life's work, and often incapacitated for the services of the State."[1] During the last two years I, with others, have been examining candidates for commissions in the Royal Air Force. We had 35,000 through our hands: 5,000 were rejected, of which about 5 per cent. had chronic middle-ear suppuration. What, I think, is now required, is that this Section should appoint a standing committee of, say, six members, to watch the Ministry of Health Bill, and be ready to advise the Government. As its chairman I would suggest Sir Robert Woods, whose work we are conversant with, who is a man of affairs, who has been President of the Royal College of Surgeons in Ireland, and is now a Member of the House of Commons. With regard to indications for operation in chronic middle-ear suppuration the following sign is useful: If a marginal perforation is present in the postero-superior segment, and pus can be seen to be drawn out by exhaustion with a Peter's magnifying speculum after thorough cleaning and drying by mopping, it demonstrates the implication of the attic and antrum. The figures given of the anatomical condition of the cortex bears out what one has been insisting upon for many years, namely, that the acellular type of bone is a very great factor in causing an acute inflammation of the middle-ear tract to result in a chronic discharge; always excluding cases of tuberculosis of the bone, those cases in which an acute mastoid abscess has burst or been inefficiently operated upon leaving a sinus behind the ear and discharge from the meatus, and the cellular type of bone in which the cells are surrounded by very dense bone. There is evidence, I think, to prove that the antrum is not always infected in acute middle-ear inflammation; but it is most frequently and quickly infected in virulent infection, such as in scarlet fever, measles, and influenza, and if the acellular type is present, the dense surrounding walls of the antrum preclude external perforation and a chronic discharge from the antrum into the meatus is established. With regard to the "modified operation," I submit that it is a bad and unscientific one in acute or subacute cases of mastoid suppuration; for the drainage into the meatus is apt to be poor, and an unnecessary permanent opening, with subsequent disabilities, is left from the antrum and mastoid cells into a deformed cartilaginous meatus: while if the Schwartze operation is properly carried out there result a healed membrane, normal meatus, good hearing, and a sound scar behind the ear. In chronic middle-ear suppuration really requiring operation, it is inefficient, and there are very few cases in which it is likely to be efficient.

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[1] *Trans. Otol. Soc. U.K.*, 1902, iii, pp. 106 and 107.

Dr. KERR LOVE: I direct attention to one point, not so much in connexion with the paper, but in a general way—namely, the connexion between middle-ear suppuration and chronic mastoiditis. Those two terms are not, and cannot be held to be, synonymous. It will be seen from otological literature that at the present time there is a tendency to operate on all cases of chronic middle-ear suppuration. During the last six years I have been treating school children under the Glasgow School Authority. I have always under my care 500 cases of chronic middle-ear suppuration, and I can count on recovery without operation in far more than one-half of those cases. The procedure adopted is, first, curetting the nasopharynx and removing enlarged tonsils. Secondly, we submit the external auditory canal and middle ear to careful treatment for a considerable period, and if discharge does not disappear or comes back, in spite of those measures, we operate on the mastoid antrum. I plead for patience with school children. If you treat them carefully in the first weeks, or months, you will get cure without operation in quite half the cases. With regard to the so-called modified mastoid operation, I have adopted it for school children more readily in the cases in which both ears are involved. I prefer not to do the radical mastoid operation when both ears are involved, unless there is very strong evidence that the radical is the only operation for the case. I have been struck by one of the points which the authors bring out—namely, that the type of disease is much worse in the children of the poorer classes. From some schools I find fifteen in twenty children brought up per day to be cases of chronic middle-ear suppuration, whereas among the better classes only five in twenty belong to that type. They are all cases of deafness. I find, also, when I take the children into hospital, that in the case of the poorer children I nearly always get findings in the mastoid process, whereas among children of the better class I sometimes get none. I think the operation has been unnecessarily done in many of those cases. There are fifty cases with normal antrum. Had all these cases been treated as we now treat school children, and at an early stage, most of them would have recovered without operation.

Mr. CHARLES J. HEATH: I was interested in hearing the last speaker say that he does not perform the radical operation when both ears are involved. I conclude, from that, that he considers it more likely that a reasonable amount of hearing will be retained after doing the modified operation, or, as I prefer to call it, the conservative operation. That is one of the most important things we have to consider. With regard to the question of the enormous number of men who are deaf, as Mr. Cheatle has already told us, from aural suppuration, it is one which will have to be faced soon, as well as the question of how we are to deal with it. No one wishes to do an operation on an ear if the disease can be cured without an operation. I find people ready enough to do an operation on the nose, or on the nasopharynx for far less serious conditions, while they hesitate in the case of the ear. On my recommendation, the Metropolitan Asylums Board have set up a hospital in London where all the children under their control who have running ears can be sent. If, after a few months' treatment, their ears have not ceased discharging, we usually do the conservative operation. Last night the resident medical officer told me he had sent out on the previous day six children who had been treated by the conservative operation, and one by the radical operation. I am not pointing that out as my handiwork, it is the work of those whom it has been my privilege to train. One of the patients I showed this evening was a nurse at that hospital. She had had pain for three days before I was informed of it. Within three hours I incised the drum-head. There was a free discharge. Next day the pain persisted in spite of the free discharge, and I said that she had an attic dam obstructing the antral drainage. That afternoon I performed the conservative mastoid operation and found pus in the antrum under pressure. You saw no disfigurement behind her ear, such as is the rule after a Schwartze operation. It is a better result than a Schwartze would have given, and she needed no bandage after eight or nine days. [Mr. CHEATLE: I object to that.] She is an example of the conservative operation performed in an acute case. Mr. Cheatle said he thought the conservative operations are undesirable in acute cases. The only drawback I can see to the conservative or any mastoid operation is the time the patient takes to get well, for bone heals but slowly. I cannot understand why people allow ears to continue running and not run the risk of an operation which is practically devoid of danger, and, if done fairly early in the case, is practically certain to arrest or prevent deafness. With regard to the after-treatment following the conservative mastoid operation: At the hospital I referred to just now, children, from 3 years of age, troop in to have their ears dressed. There are no tears nor complaints. The tube—which I instituted for this work—is taken out of the meatus, then the two little plugs; two more plugs are put in, the tube replaced, and the dressing put on. I congratulate the writers of the paper immensely on their industry, though the amount of hearing saved does not, I fear, entitle me to give them praise.

Dr. WILLIAM HILL: It is impossible to traverse the whole field opened up by even Mr. Heath's speech, but I think this meeting should lay down some guidance on one point at least, and that is, that the old Schwartze operation is not obsolete, but it is a good operation for acute and subacute cases. I am not certain it is not ample for the cases which Mr. Heath and perhaps we ourselves occasionally submit to the conservative operation. I have pointed out before that this operation was done years ago, before the Stacke, and that it is the Küster operation revived. By that operation we do not interfere very much with the ossicles and the attic. I think that in one-fourth of the cases the antrum escapes any marked disease, but it is a route for getting to the middle ear in a more direct way than we can approach it from the meatus. The Schwartze operation will do that well. Moreover, the Schwartze is a conservative operation. We make a hole in the bone, and it fills up with granulation tissue, and then with fibrous tissue. In a case which has been dealt with by the so-called Heath's method, you look in the meatus to find the posterior wall gone, and you can see into the antral cavity. Sometimes the hole fills up, but you have altered the whole balance of the ear: it must be an ear which is exposed to various vicissitudes of climate, cold draughts and water getting into the ear, and that is the operation we are asked to substitute for our usual Schwartze. That there are cases in which one may hesitate to do a complete radical operation, especially in young people who have good hearing, I can understand, and I have been in that position often myself, and sometimes I have had very good results from the modified operation. Still, results in hospital depend very much on your clinical assistants. I think Mr. Fraser has been indulging very liberally in this mitigated operation. Although seventeen is not a big proportion of the cases given, it is a large number to have submitted to this operation. I do not think there are many otologists who would do even that proportion.

Mr. W. STUART-LOW: I have worked at this subject for twenty-five years, and have now operated upon over 1,000 cases, so I can speak with authority on this subject from practical experience of my own operations. From this point of view certain remarks and statements that I have just heard in this paper I can agree with and others not. I was very pleased to listen to Dr. Kerr Love's views. There is an appalling number of children with discharging ears both in private and in the hospital clinics, and I have often asked myself why this is so. The chronic ear discharge in children undoubtedly originates in acute otitis media: this has been proved to be very common indeed in young children, and is, I am afraid, not sufficiently frequently correctly diagnosed, and the only sterling remedy for it carried out—viz., paracentesis tympani. This simple operation ought to be far more frequently done, as it is the one preventive measure against the child being launched on that sea of trouble—chronic suppuration of the middle ear. The urgent necessity for correct diagnosis of, and for the performance of, paracentesis tympani for acute otitis media should be impressed on the medical practitioner. Again, the *preventive treatment* of acute otitis media is the efficient removal of enlarged tonsils and adenoids, and when otitis has occurred and resulted in ear discharge, if every trace of the enlarged tonsils and adenoids were removed, reinfection of the ear from the throat would be arrested and the local treatment of the discharging ear through the meatus would be much more likely to result in an early successful issue in the drying up of the ear. It should also be more clearly established that ear discharge in children should not be allowed to go on indefinitely and that the next step in the treatment of it after local treatment and removal of enlarged tonsils and adenoids have failed consists in the performance of the cortical mastoid operation. I say *most emphatically* that the *radical mastoid* operation *in children* should never be undertaken. I never do so under 18 years of age, but would rather perform three cortical mastoid operations in succession at intervals of two or three years, although this is a very unlikely necessity, as the cortical mastoid, by thoroughly draining the antrum and so preventing the constant irrigation of the middle ear with purulent fluid usually results in a permanent cure. The reason for studiously avoiding the radical operation in the young is the danger of loss of hearing, whereas the even repeated performance of the cortical mastoid operation almost always ends in the hearing being perfectly restored. I never practise Mr. Heath's operation, as I fail to see the necessity for it—all cases I divide into two—those the cortical mastoid operation can cure, and those that it cannot, and upon such the radical operation should be done. I cannot recognize the need for any middle way. I do think however, that Mr. Heath, as the first surgeon ever to have cut a flap and stitching up entirely the posterior incision, to drain through the meatus, deserves credit for this, but the other steps of his operation I cannot approve, such as tinkering with special instruments through the aditus, &c. Mr. Heath and those who follow him find their chief argument in favour of his modified conservative operation in the assertion that the hearing after the radical mastoid operation is largely lost. Let these operators speak for themselves, because I can truthfully aver that my results as regards hearing have been exceedingly good. I have shown a sample of many of my cases here to-day, in which after the ear discharge had gone on for thirty years the hearing after the radical mastoid operation is 25 per cent. better than before the operation, and this is only typical of most of my results. What has given a handle to those who decry the radical operation is that there are many badly performed operations to be met with, and I am afraid some indifferent operators are in the field. To attain my good results I lay stress on certain points, which are briefly as follows: Efficient and careful preparation of the patient for operation, by the removal of all carious teeth and cure of pyorrhœa alveolaris by the aid of the dentist. The septic tonsils are also enucleated, adenoids removed, and the nose made free and aseptic. The general health is carefully attended to, and change of air advised. Locally the ear is cleared of discharge by the Eustachian catheterization and the use of sprays and Siegle's suction by the meatus, and by an antiseptic vapour (kelvolin) being forcibly blown into the tympanic cavity: these measures are carried out over an interval of a month previous to the operation. The discharges are always carefully examined by a bacteriologist and vaccines used for some weeks. At the time of operation I take particular care never to curette the inner wall of the tympanic cavity, so as to avoid scar tissue resulting. I fill the ear cavity just before stitching up the wound at the end of the operation by pouring into it 10 c.c. normal horse serum, and insert one gauze plug only, which is removed next day, and no more plugs are ever inserted nor any rubber tubes whatever. An aural shield is placed over the ear and the gauze dressing put over it, and then the bandage applied over all. This effectively prevents bandage pressure on the ear, and so all narrowing of the meatus is avoided and drainage facilitated. My average time for the patients to remain in hospital is eight to ten days as against twenty-two days mentioned by Mr. Fraser in Edinburgh.

Dr. DUNDAS GRANT: It is singular that Mr. Heath should have said that the usual operations for acute suppuration in the middle ear performed on the mastoid process are not conservative and are not carried out with the view of preserving or restoring hearing. [Mr. HEATH: I did not say it.] It is in Mr. Heath's book on "Otitis Media" (p. 20). The Schwartze operation is intended to preserve and restore the hearing, and I cannot think why one should want to do anything further in the way of making a hole in the posterior wall of the meatus. Not long ago, I saw a case which had been treated in this way, and it was discharging still. [Mr. HEATH : I have seen discharge after a Schwartze, often, and there has been great disfigurement too.] That may happen in the operation, but it is quite exceptional for the patient not to get perfectly well after a Schwartze. I therefore think it unnecessary to perform an operation which leaves a chronic fistula : if a fistula were left behind the ear in a "Schwartze" you would call it a bad operation, and a fistula in the meatus is much the same thing. I do not see the possibility of substituting a conservative operation for the radical in many cases of chronic suppuration. I cannot help thinking that Mr. Heath's teaching has been practised by some of the surgeons who have been operating upon soldiers, for I have in a number seen this opening in the posterior wall of the meatus, and masses of granulations still discharging, so that I have had to convert the "conservative" into a true radical mastoid operation. I object to Mr. Heath's statement that the radical mastoid operation necessarily means "deafness." [Mr. HEATH : Have you ever seen perfect hearing after it? I never have.] I have seen very good hearing after the radical mastoid operation. But is diminution of hearing to be called deafness? The person's hearing organ has been injured by disease. This use of the word "deafness" is misleading. [Mr. HEATH : If you can do the radical operation and have no deafness I shall be glad to see the case.] [The PRESIDENT : The conditions are totally different. The radical mastoid in one case is done for disease which affects the hearing very seriously, and from which it can never recover. The result, naturally, is bad hearing. The modified mastoid operation is done for disease which has not permanently affected the hearing, and equally naturally, there ought to be good hearing.] At a recent meeting here I showed a gentleman on whom I had done a radical mastoid operation fourteen years ago and he heard a whisper at 16 ft. Certainly he was not deaf. Where ossicles have been removed by the radical mastoid operation, surely the resources of otologists are equal to providing an artificial drum. These charges against the radical mastoid operation are unfairly stated. The question has also been raised as to whether grafts interfere with the hearing power. My impression is that they do not. There is some difference in Mr. Fraser's statistics in regard to that. A very convincing case under my care was that of a gentleman on whom I operated on both sides. On one side I grafted, on the other I did not, the hearing beforehand being very much the same in both. Afterwards, the hearing in the grafted ear was much the better of the two. With regard to the indications for the modified operation, there is one which is worth considering : that is, when the anterior part of the tympanum is shut off from the aditus and antrum. In such a case the modified operation is very strongly indicated. Having criticized Mr. Heath, I should like to say I admire the result of his technique in those cases in which his operation is indicated.

Mr. SOMERVILLE HASTINGS: The following is my experience with acute and subacute cases in regard to the Schwartze and the modified operations: For several years my practice was to perform the Schwartze operation. Whether my technique was faulty I cannot say, but I found them slow in healing, and a sinus was often left. Then I tried this modified operation. And certainly my cases have healed much quicker after the modified than after the Schwartze operation; also the dressing appeared to me to be much more easy and satisfactory. I started otology much later than most of the speakers, therefore I commenced with no prejudices in favour of the Schwartze operation, yet I have largely given up doing the Schwartze for acute and subacute cases, especially in children, and am doing the conservative operation almost exclusively. For chronic cases, of course, I still always do the radical operation.

Sir CHARLES BALLANCE: In the first place, I have never seen Mr. Heath operate, but I have seen some of his cases afterwards. Some of them are not good results. It seems to me we have not been discussing what is really the essential point, and that is, When should an operation on the bone be done? Among the cases of acute otitis media we have all seen fulminating cases in which the mastoid process is rapidly involved, and in which, after three or four days, the cells are full of pus. Those cases, of course, require operation: wherever pus is, it must be let out. Personally, I think there is nothing better than the Schwartze operation for such cases, that adequate and thorough drainage is obtained by this method, and that not only perfect hearing, but complete healing takes place in a reasonable time. I am sure there are cases in which the Schwartze operation would not be altogether desirable, and need not be completely done. But then I would say that the surgeon should never commence to do an operation by a name; he should adapt his operation to the case according to what he finds, for during the progress of the operation he learns things. It is so in all departments of surgery. Now with regard to the acute cases which require operation. Take the London Fever Hospital. Dr. Caiger told me years ago that the great majority of cases of otitis media acuta heal up before the patient leaves the hospital, without loss of hearing. So that the majority of the cases heal up without the necessity of any operation at all. Still, there are a certain number of patients who do require operation; and Mr. Cheatle mentioned those cases in which the tympanum is early and acutely involved, and in which the ossicles soon become carious. I reply to Mr. Cheatle that in such a case an operation should have been done, and that the ossicles should not have been allowed to become carious. That kind of operation should be done which will give absolute and free drainage to the tympanum. In the radical operation and in operations for acute disease we should avoid, as far as possible, interfering with the tympanum. There are many cases in which the mucous membrane of the tympanum is practically healthy and in which one or more of the ossicles are healthy. I believe success in the treatment of the chronic disease depends on doing as little as possible to the tympanum—I mean success with regard to the amount of hearing left to the patient. The same is true of acute cases, especially of those acute cases which fulminate into the mastoid process, because the tympanum, then, is only a conduit for the escape of pus, and if you open the mastoid you get drainage of the pus through the wound, and the result is the tympanum heals and the case recovers with perfect hearing. I think the differences expressed here to-day lie not so much in differences in the methods of operating as in the decision as to the cases which should be operated upon. It is impossible to lay down rules, because the exact condition is not known. But some surgeons operate early, and others say an operation should not be done. Without differences of opinion we cannot advance, and I am rather inclined to think we shall advance in the future more on the lines of earlier operating, so as to try to save the tympanum from damage. In what direction the advance should take place, however, I cannot say.

Dr. DAN MCKENZIE (replying for the authors): We have been listening largely to impressions—from Mr. Heath, from Dr. Grant, from Sir Charles Ballance, and even from Mr. Cheatle. But the paper which has been placed before you deals with facts. Mr. Heath has not given me figures: I have asked him for them. Let us have members producing their facts and statistics, as Mr. Fraser and his colleague have done. Then we shall be able to discuss these questions with more knowledge than we can at present.

Mr. J. S. FRASER (prevented by illness from being present, sent the following reply to the discussion): I cordially approve of Mr. Arthur Cheatle's suggestion that a standing committee should be appointed to watch the Public Health Bill, and to see that the otological aspect of public health is not forgotten. I agree with Mr. Cheatle that my findings at operation with regard to the structure of the mastoid process bear out his views with regard to the incidence of chronic middle-ear suppuration. Further, I believe that Mr. Cheatle is right in saying that in cases of mastoiditis in acute otitis media one usually finds the cellular type of bone. This is one of my great objections to performing the modified radical operation in cases of acute or subacute otitis media with mastoiditis. The tip of the mastoid process lies below the level of the external meatus, and consequently the operation cavity cannot be efficiently drained into the meatus. To put it in another way, I agree with Mr. Cheatle and other speakers that in cases of mastoiditis following acute middle-ear suppuration, the Schwartze operation is the most efficient. Through the incision made down to and past the tip, the whole of the diseased cellular structures in the mastoid process can be cleared out and efficient drainage secured. Further, the ear is left in a better condition than after the conservative mastoid. The only acute cases in which the conservative operation might be suitable would be those with a sclerotic mastoid process, in which there are no tip cells, and even here I think that the Schwartze procedure would be better. On the other hand, in cases of chronic suppuration the hearing is usually so poor that it is of little use to the patient, granted that the other ear is normal or almost normal. With poor hearing in the ear to be operated on, it is not worth while to perform the modified or "conservative" operation unless the hearing of the other ear is bad. I agree with Mr. Cheatle that cholesteatoma in the attic, aditus and antrum, with healthy ossicles and good hearing, is an indication for the modified radical operation. Such cases, however, are rare. With regard to Mr. Heath's case of *recurrent* suppuration cured by the modified operation, I can only say that, as the case was one of recurrent suppuration, it was not surprising. The patient might have had a dry ear at the present time even if no operation had been performed. One would like to know, however, whether Mr. Heath holds that there is no possibility of suppuration recurring next time the patient gets a cold in his head. I agree with Dr. Kerr Love that about 50 per cent. of chronic cases are curable by conservative treatment without operation at all. It is necessary, however, for this treatment to be carried out by skilled nurses. It is quite useless to tell the patient's mother to put in peroxide drops and to syringe the ear, &c. Even a nurse new to ear work takes two or three weeks before she is able efficiently to carry out conservative treatment. Until Mr. Heath publishes a paper somewhat similar to the present one (or to that published by Dr. Dickie and myself in 1912), I do not think that we will get very much further forward in this controversy. Until this time arrives we have only the report of Plumer and Mosher regarding the end results of Mr. Heath's conservative operation. It is useless for Mr. Heath and his followers to say that the radical mastoid operation is dangerous, and that it destroys the hearing, whereas the "conservative" operation is free from danger and preserves or restores the hearing. They are not comparing like with like. I understand that Mr. Heath performs his operation in many cases of acute and subacute otitis media with mastoid involvement. I have not in this paper dealt with cases of acute otitis media at all, though I am quite willing to publish the results of my Schwartze operations. Again, as Mr. Heath has himself acknowledged, cases coming to the Royal Infirmary are very largely drawn from country districts, and are often sent in only when an intracranial complication is already present. I have drawn attention to Mr. Adair Dighton's remarks comparing the results of the radical and modified radical operation, and I should like to have heard from Mr. Heath either a justification of, or an apology for, these remarks. When I was working at Golden Square, in 1904, my recollection is that Mr. Charles Heath was doing a sort of Stacke operation for chronic middle-ear suppuration, attacking the antrum from the posterior wall of the bony meatus, removing the outer wall of the aditus and attic along with the drumhead, malleus and incus, cutting a meatal flap, inserting a rubber drainage-tube into the meatus and closing the posterior wound. At that time he also talked a good deal about conserving the hearing. A little later I was surprised to find that Mr. Heath was doing quite a different operation, the Küster or so-called "conservative" mastoid. In this he leaves what he formerly took away and takes away what he formerly left. It seems to me that Mr. Heath first of all rediscovered the Stacke operation, and later the Küster operation. It only remains for him to rediscover the radical mastoid procedure. With regard to the question of conserving the hearing, or improving the hearing, we all wish to do this. On the other hand, we want if possible to cure the suppuration. The question is: What amount of hearing is really of use to the patient? If a patient has normal or almost normal hearing in one ear, while in the other (ear to be operated on) he hears the conversation voice at anything up to 4 or 5 ft., he will not use the bad ear but will depend entirely on the hearing in the good ear. Thus, unless the hearing in the ear to be operated upon is better than "conversation voice at 4 ft.," it is not worth while to do the modified radical operation, granted that the good ear is normal or nearly normal. On the other hand, if the hearing in the "non-operation" ear is bad, then it is well worth while to do the modified operation even though there is less likelihood of obtaining a dry ear. One can always perform the radical operation later if necessary. Mr. Heath is wrong when he says that only seventeen modified operations were done as compared with 280 radicals. The number 280 includes fifty-two radical mastoid operations performed previous to 1911, and published in the previous paper. If Mr. Heath takes this number (280) he must also include the modified radicals published at that time; these numbered eleven, so that the total of modified radical operations is twenty-eight—i.e., 10 per cent. My findings at operation show that Mr. Heath's pathology is wrong, and that the antrum is not the source of the pus in *all* cases of discharge from the middle ear. Mr. Hill and Dr. Dundas Grant are quite right when they state that the opening from the antrum into the meatus left by the Heath operation is a possible source of danger, at least in cases in which the aditus also remains open. Some years ago Sir William Milligan pointed out that, if there was a perforation in one drum-head, even though a dry one, that ear was much more liable to infection in cases of "cold in the head." He drew an analogy between this condition and that where a man tries to blow smoke into a bottle. If the bottom of the bottle is whole it is not easy to blow smoke into it, but if the bottle has a hole in the bottom then it is quite easy to blow smoke into and through the bottle. I take it that a permanent perforation of the drum-head, or a fistula through from the aditus and antrum to the meatus, corresponds to the hole in the bottom of the bottle. I cannot show a patient after the radical operation with as good hearing as Dr. Dundas Grant's case—i.e., whisper at 16 ft., but I have one case where the patient can hear the whisper at 6 ft. In this I notice that both window niches are freely open, one can see the footplate of the stapes (the crura being absent) and the niche leading to the round window. I would suggest that next year the Council of the Section should consider the question of having a meeting to discuss "the operative treatment of mastoid complications in cases of acute and subacute otitis media." Mr. Heath would no doubt champion the "conservative" operation, and I am sure some otologist could be got to give his results regarding the Schwartze operation.

Septic Infection of the Lateral Sinus accidentally injured during the Operation of Mastoidectomy.[1]

By HUNTER TOD, F.R.C.S.

IN this short paper I include only those cases in which the mastoid operation was performed for chronic suppurative disease of the middle-ear cleft and mastoid cells, and in which, at the time of the operation, the sinus was apparently healthy. Theoretically such injuries should not occur, and strictly speaking may be considered the result of careless or faulty technique; but nevertheless I feel sure that the majority of those who have performed a large number of mastoid operations have injured the sinus wall on more than one occasion. Fortunately subsequent septic infection of the sinus, as the result of being injured, rarely takes place, if we can judge from the few cases recorded in literature, although perhaps this is no criterion on which an opinion can be based. Such injuries to the sinus may be divided into two groups:—

(1) A clean cut through the wall of the sinus with profuse hæmorrhage, necessitating obliteration of the lumen of the sinus at the point of injury in order to arrest the bleeding. In these cases I have never observed subsequent infection of the sinus.

(2) Grazing of the outer layer or puncturing of the sinus wall with no bleeding, or with only slight oozing of blood for a moment or two, the injury sometimes being so slight as to escape notice unless a careful examination be made at the end of the operation; and even then only a slight tear or scratch may be observed in the dura mater, exposing a tiny area of a reddish-blue colour, the inner coats of the sinus wall.

Before discussing my cases let me draw your attention for a moment to the anatomy of the mastoid region (fig. 1), from the operative point of view in connexion with injury to the sinus. Two types may be considered:—

(1) The easy type; usually in dolichocephalic skulls having roomy

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[1] At a meeting of the Section, held February 21, 1919.

mastoid cells with the sigmoid sinus placed far back. In such cases the sinus can rarely be injured.

(2) The difficult type; most frequent in brachiocephalic skulls in which the structures are compressed together, giving little room for the exposure of the antrum. The mastoid process is composed of compact, hard bone. The sigmoid sinus is usually superficial and protrudes over the outer wall of the antrum, which may be very small and situated high up, almost under cover of the middle fossa of the skull.

I have notes of six cases in which the lateral sinus was infected after injury during the mastoid operation, all of which were of this anatomical type, and which I will now briefly describe. The primary operation was performed by myself in four of these cases (representing less than ½ per cent. of the total number of cases operated on), by my house surgeon in the other two cases.

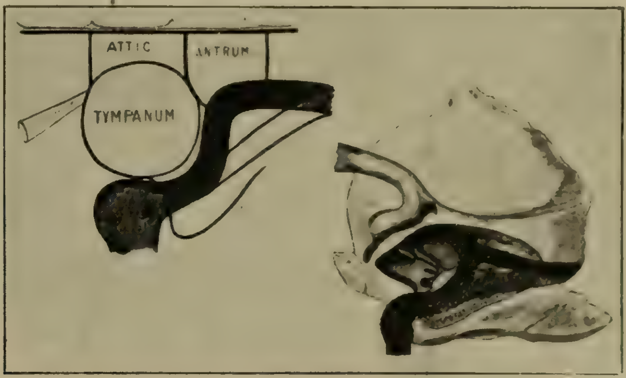

FIG. 1.

Case I.—E. I., female, aged 10. Operation 1907 (by house surgeon). Chronic otorrhœa of the left ear. The tympanic cavity was filled with cholesteatomatous masses; there was almost complete destruction of the tympanic membrane with a fistula leading into the attic region. There was some tenderness over the mastoid process. Temperature 100° F., pulse 112. Complete operation was performed. The antrum was small and the bone sclerosed. The sigmoid sinus was exposed over a small area. The wound was closed by sutures. Although the patient felt well after operation with complete freedom from headaches, she had an irregular temperature, gradually falling to normal on the seventh day after the operation. On the eighth day there was sudden pyrexia of 104° F. with some restlessness and a tendency to drowsiness. Pyrexia was maintained till the tenth day, when a rigor occurred. I then re-opened the wound, exposing the sinus freely to tip of mastoid. The lower part of the sinus was thickened and white; the upper part appeared normal. The internal jugular was then exposed in the neck; it was found collapsed above the common facial vein. The common facial vein was ligated and separated from the jugular vein, the upper portion of the jugular vein being dissected up and brought into the neck. The lateral sinus was freely incised and a large septic clot removed from the lower part of the sinus as far as the bulb. There was free bleeding from the posterior portion of the sinus after the gauze was removed; this was arrested by re-plugging. An attempt made to syringe through the lower part of the sinus into the neck failed. Twenty-four hours after operation temperature became normal; there was then varying pyrexia for a few days, afterwards the temperature became and remained normal. Uninterrupted recovery.

In this case the second operation should not have been delayed so long. The occurrence of sudden pyrexia a week after the operation should have suggested infection of the lateral sinus.

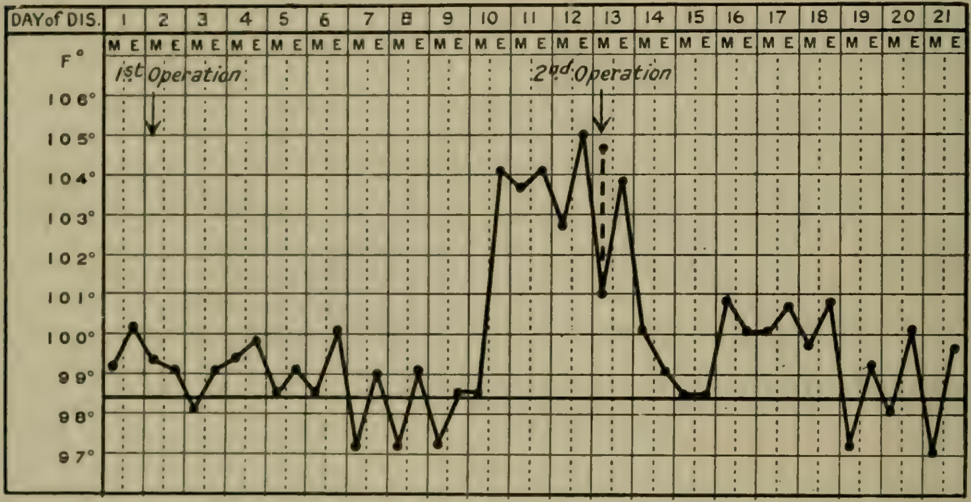

CHART I (Case I).

Case II.—T. P., male, aged 33. Operation 1909. He had suffered from chronic middle-ear suppuration with intermittent attacks of headaches on the affected side for several years. There was marked middle-ear deafness, and the tympanic cavity was filled with granulations. The complete mastoid operation was performed. The mastoid process was hard and sclerosed. The sinus wall was grazed at the "knee" by the chisel. There was no bleeding. The posterior wound was closed by sutures and the meatus lightly packed. The wound was dressed on the third day. On the fifth day after the operation there was sudden pyrexia with rise of temperature to 102·6° F. The wound was redressed, and was apparently healthy. The pyrexia subsided, temperature becoming normal on the ninth day. The stitches were then removed, as the posterior wound was completely healed. There was a rigor on the morning of the tenth day, with pyrexia of 103° F. The mastoid wound was re-opened, and the lateral sinus freely exposed. There were yellow granulations over the site of the injury. The sinus was obliterated above and below by pledgets of gauze inserted between the bone and sinus wall. The intervening portion was slit open and the clot removed. As the clot extended towards the bulb, the internal jugular and common facial veins were ligated and severed between ligatures, the upper portion of the jugular vein being dissected up and brought into the neck. The patient made a complete recovery.

In this case I consider the treatment was correct, as the pyrexia on the fifth day subsided after the wound was dressed, and the wound appeared healthy.

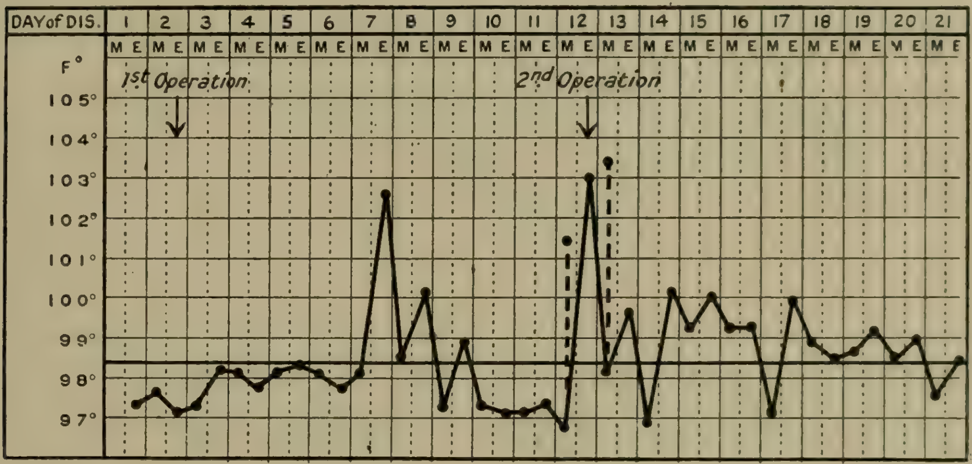

CHART II (Case II).

Case III.—M. H., female, aged 19. Operation 1909 (by house surgeon). She had had chronic otorrhœa since childhood. Complete mastoid operation was performed. The sinus was exposed over small area and found to be healthy. The temperature was normal for eight days after the operation, when there was pyrexia of 103° F. with rigor. On the ninth day I operated again. As the patient seemed very ill and to be suffering from definite septic absorption, I first ligated the internal jugular vein, bringing the upper part into the neck wound. After freely exposing the lateral sinus a perforation of its wall was found where it had originally been exposed at the first operation. A large septic clot was removed. The superior petrosal sinus also seemed thrombosed as no bleeding took place at this point after plugging the sinus above and below. Septic symptoms continued with rigors. Three days later there was œdema of the right eyelid with exophthalmos, the left eye being similarly affected the next day. Death from pyæmia took place four days later. The autopsy showed septic thrombosis of the circular and both cavernous sinuses, extending into both ophthalmic veins.

Infection of the superior petrosal sinus fortunately is a very rare occurrence, but almost certainly fatal.

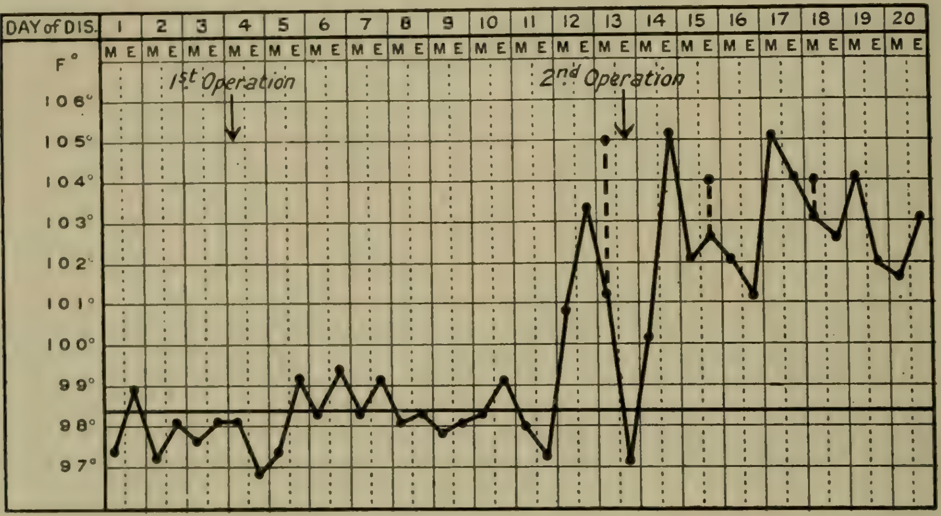

Chart III (Case III).

Case IV.—F. J. G., male, age 24. Operation 1912. He had had chronic otorrhœa of the right ear since infancy. Six years previously ossiculectomy had been performed by another aurist, and after that otorrhœa ceased for four years. There was no pain, but nearly complete deafness. The tympanic cavity was filled with granulations. The complete mastoid operation was performed. The bone was very sclerosed. The sinus was very far forward and was exposed at the first blow of the chisel, the outer wall being punctured, with slight oozing of blood which was stopped by temporary compression. The posterior wound was closed. The patient did well till the eighth day, when there was pyrexia of 100° F. with headaches. On the ninth day there was pyrexia of 102° F. On the house surgeon removing the gauze packing from the meatus there was brisk hæmorrhage. An anæsthetic was immediately given by another house surgeon who was present in the ward. The posterior wound was opened up; the hæmorrhage was found to be coming from the lateral sinus at the point exposed at the previous operation. The hæmorrhage was arrested by firmly packing with gauze. Next day (the tenth) there was pyrexia of 103·6° F., with pulse-rate of 128. Under a general anæsthetic I re-opened the wound and freely exposed the sinus, obliterating it by inserting gauze plugs between the bone and sinus wall above and below the area originally plugged. The sinus was found to be thrombosed, the central portion of the clot being already purulent. The gauze plug was removed and the clot curetted out until brisk hæmorrhage occurred at both points, fresh plugging then being inserted. Next day the temperature was subnormal, but the following evening there were several rigors with temperature of 103·6° F. The patient looked ill but made no complaint of pain. The next morning (the third day after the previous operation) a general anæsthetic was given again and the jugular vein ligated, the upper portion being brought out into the neck wound. The lateral sinus was again examined. On removing the posterior plug there was brisk hæmorrhage, which was arrested by re-plugging. The superior petrosal sinus also bled freely until the hæmorrhage was arrested by plugging. A firm clot was scraped out of the jugular bulb. For some days after the operation there was slight irregular pyrexia, the mastoid wound being very foul, and the wound in the neck breaking down. Eventually there was complete recovery. Blood cultures taken from a vein in the arm at the time of the second operation grew streptococci in twenty-four hours. Vaccines prepared from these cultures were given by subcutaneous injection on the third, sixth, thirteenth, twentieth and twenty-seventh days after the operation.

In this case the sinus should have been freely exposed and obliterated over the affected area at the time the hæmorrhage was arrested. As this was not done I should have tied the jugular vein when I operated on the following day.

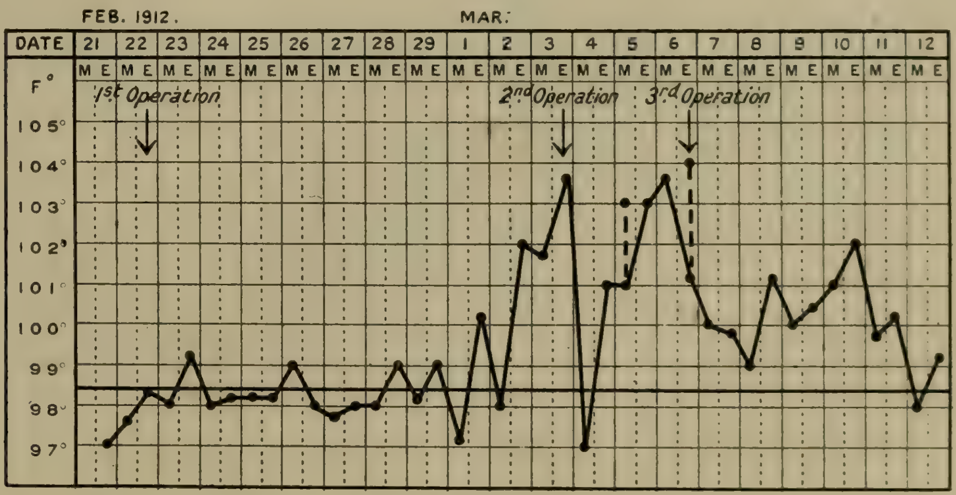

CHART IV (Case IV).

Case V.—J. H., male, aged 35. Operation 1914. He had suffered from chronic otorrhœa of the right ear for fourteen years, which became worse during the three months preceding the operation, and was accompanied by frequent headaches. Deafness was marked. On examination the ear was found to be filled with granulations. There was no swelling nor œdema, but tenderness on pressure over the mastoid region. The complete mastoid operation was performed. The bone was sclerosed, and the antrum filled with inspissated pus and epithelial débris. The sinus was very superficial and was exposed over a small area at the "knee." The outer wall of the sinus was grazed; there was no bleeding. The cavity was irrigated with hydrogen peroxide solution before packing, and the wound closed with two stitches. The patient did well till the eighth day, when there was pyrexia of 102° F. with increasing pulse-rate. On seeing the patient on the morning of the eighth day after operation, as he complained of headache and general malaise, and as there was increasing pyrexia, I decided to explore the sinus that evening. A few hours later he had a rigor. On operating the same evening I found a definite parietal thrombus at the site of injury. After obliterating the sinus behind and below this region, I excised the affected part and sent it for microscopic examination, a section of which is now shown, together with a drawing made from the specimen in which chains of streptococci can be seen. This patient made an excellent recovery.

The interesting points of this case are: (1) The diagnosis of septic infection of the lateral sinus from the occurrence of the sudden pyrexia nine days after the operation. (2) The limited extent of the infected area in the sinus wall.

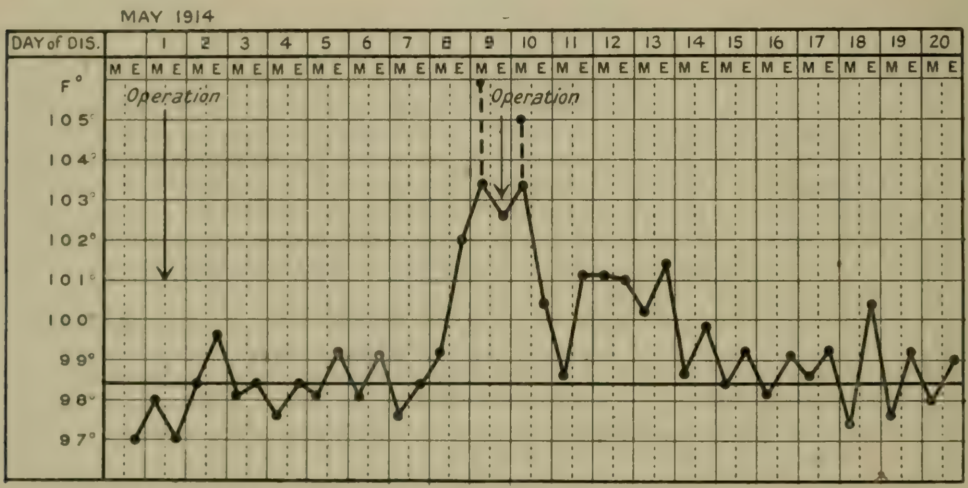

Chart V (Case V).

Case VI.—D. T., female, aged 22. Operation 1917. The complete mastoid operation was performed for chronic middle-ear suppuration associated with intermittent attacks of headaches. The middle ear was found to be filled with granulations. The mastoid was sclerosed. The sigmoid sinus was punctured, with slight oozing of blood as it lay superficial to the antrum. Within two days after the operation there was irregular pyrexia, varying from 99° F. to 102° F. On the ninth day after the operation, whilst the house surgeon was dressing the wound, there was considerable hæmorrhage, which was arrested by packing through the meatal wall. There were no rigors. Next day the wound was re-opened. On removing the packing there was profuse bleeding from the lateral sinus. More bone was removed in order to expose the sinus wall freely on each side. A gauze plug was then inserted as far back as possible and also down towards the jugular bulb between the bone and the sinus wall, the original median plug being then removed. As the pyrexia continued, an anæsthetic was given again four days later (the fourteenth day after the first operation). A purulent clot was found in the lower part of the lateral sinus beyond the lower plug of gauze. The jugular vein was then ligated, and its upper portion brought out into the neck wound. The posterior plug behind the affected area was then removed, the sinus wall being slit up still further, and the clot removed until free bleeding took place. A fresh plug was then inserted. Three days later pyrexia recurred, denoting a septicæmia of a severe type with acute synovitis of several joints and pyæmic abscesses of the buttocks and one shoulder. The patient eventually recovered, after a prolonged illness.

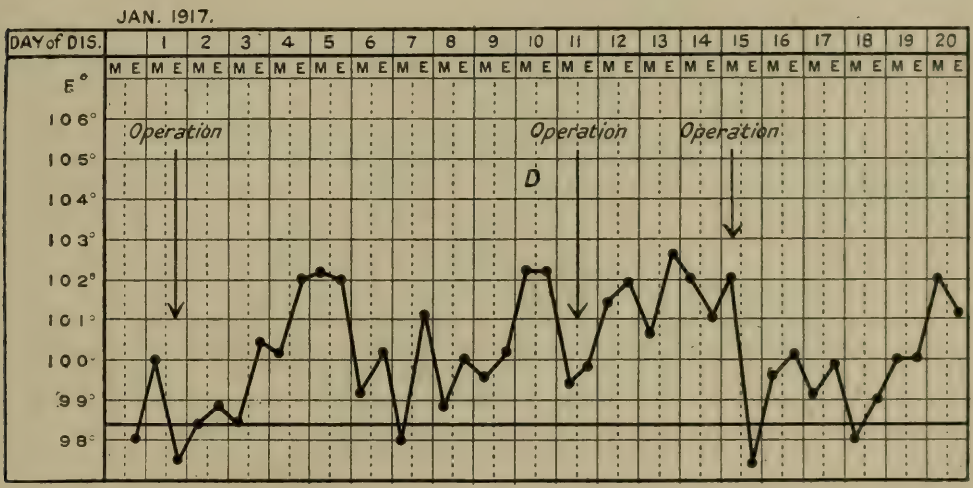

Chart VI (Case VI).

As in Case IV, hæmorrhage from the sinus on the ninth day should have been a sufficient indication for the free exposure of the sinus and for a more thorough operation. As this was not done, when I opened up the wound next day I should have ligated the jugular vein in addition to removing the clot from the sinus.

The following case, although it cannot be grouped amongst those already mentioned, demonstrates how easy it is for the lateral sinus to become infected:—

Case VII.—F. S., male, aged 8. Operation 1907. The complete mastoid operation of the right ear was performed for chronic middle-ear suppuration. When the mastoid cavity, which was filled with cholesteatomatous masses, was curetted out the sigmoid sinus was found to be already exposed over a small area. The posterior wound was only closed in its upper and lower angles, and the cavity lightly packed with gauze. On the third day there was a rigor with temperature of 106° F. When the house surgeon dressed the wound there was slight bleeding, which was arrested by plugging. The temperature remained irregular, from 99° F. to 101° F. until the eighth day, when there was a further rigor. The next day there was pain in the right hip on movement. On the following day (the tenth after operation) I again saw the boy and diagnosed lateral sinus thrombosis. The sinus was freely exposed, obliterated above and below, and incised. No definite thrombus was found, but localized thickening of the wall at the "knee" of the sinus. The temperature remained normal with an occasional rise to 100° F. for about four weeks and then it became normal. Eleven days after the second operation there was facial paralysis, and some œdema of the right optic disk. Two weeks later the facial paralysis had become less marked. About this date there were attacks of vomiting, there was marked wasting, and a tendency to fretfulness. A week later there was paresis of the sixth nerve on the left side which gradually became complete, followed by paresis of the sixth nerve on the right side with slight optic neuritis. Eventually the patient made a good recovery.

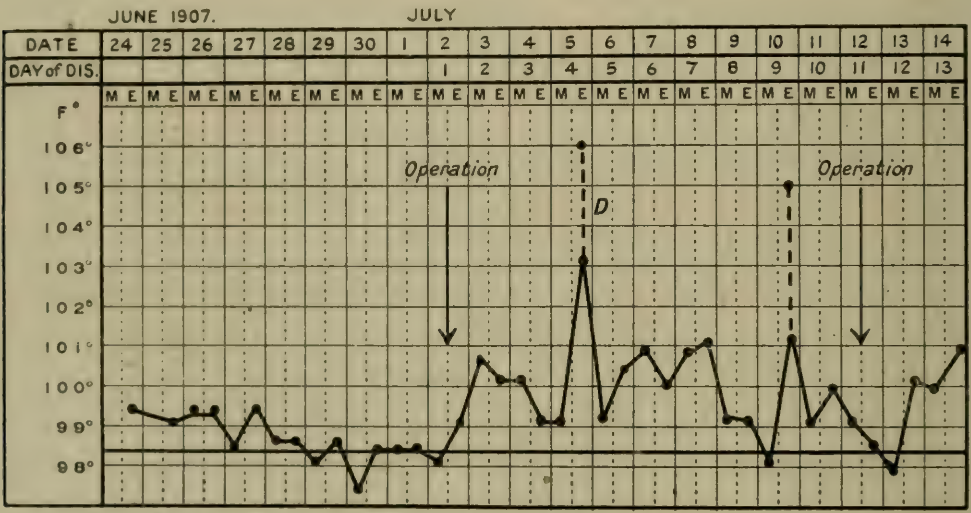

CHART VII (Case VII).

The diagnosis seemed to be a non-suppurative basic meningitis, the actual cause of which was unknown, but presumably the result of infection of the lateral sinus. In this case also the sinus should have been freely exposed on the third day after the occurrence of the rigor and hæmorrhage, and obliterated well beyond the infected area.

Lastly, let me mention another type of case in which there seemed to be evidence that the lateral sinus was injured at the time of operation, but the patient recovered in spite of the sinus not being subsequently opened.

Case VIII.—C. H., female, aged 28. Operation 1907. The complete mastoid operation was performed for chronic middle-ear suppuration associated with marked middle-ear deafness. The sinus was exposed over a small area during the operation and found to be apparently healthy and uninjured. The wound was closed by sutures and healed well. On the eleventh day after the operation there was pyrexia of 100° F., next day rising to 103° F.; then there was irregular hyperpyrexia of a septic type for some days following. There were no rigors. The patient complained of no definite pain, but of general malaise. There was no vomiting, no optic neuritis, nor were there any other symptoms suggesting an intracranial lesion. As the sinus appeared healthy at the first operation it did not seem possible that this could be the cause of the fever, but to make certain the wound was reopened on the twentieth day after the first operation. More bone was removed and the sinus freely exposed. Its walls were found to be healthy except for a small area covered with granulations at the site where the sinus was originally exposed, and it was easily compressible. For these reasons nothing was done, and the wound was partially closed. Healing again took place but the hyperpyrexia continued, the patient becoming worse. Three days later there were septic pneumonia and pleurisy, followed later on by cystitis, hæmaturia, synovitis of both

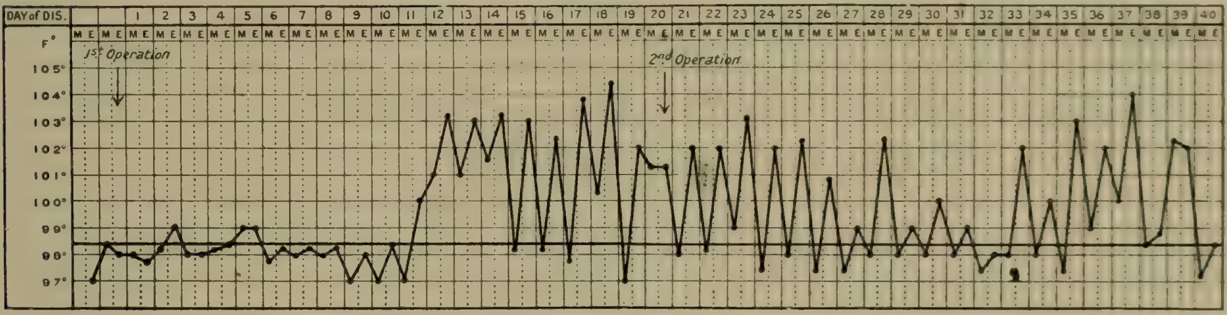

CHART VIII (Case VIII).

knee-joints and one ankle-joint, and subsequently abscesses of the buttocks—an obvious case of septicæmia. Cultures of the blood showed the presence of streptococci, and vaccines were prepared. The first dose was given on the twenty-eighth day after the first operation and subsequently they were given at intervals of five or six days, and they appeared to have a beneficial effect. Ultimately the condition improved, the patient being practically free from the septicæmic symptoms, and the temperature again became normal about the ninth week after the original operation.

I have no doubt that the cause of the septicæmia was infection of the sinus wall at the time of the original operation and that if I had opened up the sinus as soon as the hyperpyrexia occurred—that is on the twelfth day after the operation—the onset of septicæmia would have been prevented. It is interesting to note that throughout all this long period no rigors took place.

Certain points become evident from a general consideration of these cases:—

(1) Whenever the lateral sinus is exposed during the mastoid operation careful inspection should be made at the end of the operation to see if it has been injured in the slightest degree.

(2) If the sinus wall has been injured the wisest procedure is to expose it freely on each side and obliterate its lumen completely by means of gauze packing well beyond the affected area. This procedure is indeed suggested by the fact that septic infection of the lateral sinus does not occur in cases in which the sinus wall has been cut clean through and its lumen at once obliterated by pressure in order to arrest the hæmorrhage.

(3) There may be no evidence of infection of the lateral sinus until about the tenth day after the mastoid operation has been performed, when a sudden rigor may be the first symptom. As a rule for one or two days previous to this there is pyrexia with increased pulse-rate. These symptoms should be looked upon as danger signals, and if there be no other cause for them the mastoid wound should be re-opened and the sinus wall explored, and if necessary incised.

(4) If hæmorrhage occurs from the mastoid wound a few days after the operation, it is not sufficient to arrest the hæmorrhage by applying pressure to the bleeding spot. The bone should be removed from the sinus wall above and below the affected area, and gauze plugging inserted between the bone and the outer wall of the sinus, the sinus

then being slit up and explored, further surgical treatment depending on what is found. Hæmorrhage from the sinus after the mastoid operation means that the wall has been injured or that it was already infected at the time of the operation. Hæmorrhage associated with pyrexia or a rigor always means septic infection of the lateral sinus and indicates an immediate and thorough operation.

(5) The internal jugular vein should always be ligated in cases of septic infection of the sinus in which hæmorrhage has occurred, as in these cases the thrombus is probably diffuse, and the walls of the sinus already infected even to a greater extent than is evident to the naked eye.

(6) Intermittent pyrexia of a septic type without rigors, beginning after an interval of about ten days after the mastoid operation, should always suggest blood infection through the lateral sinus, and warrants exposure of the sinus and probably its obliteration after exploration. This condition must not be confused with the intermittent pyrexia which may occur for some days after an operation for acute inflammation of the mastoid, the result of scarlet fever or streptococcal infection, which is probably due to toxic absorption from the affected wound surface itself, and which usually subsides without further surgical interference.

DISCUSSION.

Dr. DAN MCKENZIE : I heard Mr. Tod's original remarks on this subject in 1914,[1] and since then I have had three cases of lateral sinus thrombosis occurring on the tenth day following exposure of it at operation : I have seen the bleeding, and had practically the same experience as his. In one case the opening in the sinus wall through the bone was very small and yet bleeding took place, and I am certain the sinus was not injured. I expect the pulsation of the sinus wall led to it being frayed against the sharp bony edge of the opening, and there were bursts of blood when the dressing was being changed. One case which I lost had both lateral sinuses involved, and I did not know which one to go for when there was bleeding : I decided to go for the ear which was most acutely involved, but I was wrong. I then went to the other side, but the bleeding was so tremendous that it was impossible for me to control it and explore the sinus. The other cases we had we brought round. I remember another curious instance in which, in a cortical mastoid operation, I had made a transverse incision in addition to the post-aural incision, and in doing so cut through a large mastoid emissary vein. There was free bleeding, and I had to pack the emissary vein. Ten days later there were signs of lateral sinus thrombosis, and I re-opened, exposing the sinus and its tributary vein and took out a coagulum from the latter. The patient promptly recovered. I agree with operating early, and, where you know that exposure of the lateral sinus is likely to lead to thrombosis, if there is a rise of temperature you should open it up and inspect it without delaying more than forty-eight hours.

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[1] Discussion on Mr. Hugh Jones's paper on "Septic Invasion of Lateral Sinuses" (Clinical Congress of Surgeons of North America), *Brit. Med. Journ.*, 1914, ii, pp. 402, 403.

Dr. H. J. BANKS-DAVIS: Considering the frequency with which the lateral sinus is exposed at operations, it is extraordinary how rarely it gets infected: in fact it would seem to be difficult to injure it even if one wanted to. I once snipped a piece of the sinus out with fine bone forceps when operating on an extensive cerebral abscess where the sinus was adherent to the bone which was being removed. The hæmorrhage was tremendous, but I was able to plug it and to continue. I gave instructions not to take the plug out under three days, but it was removed in forty-eight hours, and the hæmorrhage recurred. As long as it was plugged the patient remained safe. It was left in four days, next, but on removal there was again hæmorrhage. The patient lived a couple of months afterwards, and then died of basal meningitis. I think the plugs put in between bone and lateral sinus are liable to become septic unless frequently changed. How long does Mr. Tod retain his plugs?

Mr. STUART-LOW: In the course of numerous operations, I have certainly encountered many cases such as Mr. Tod enumerates, but I have not found that wounding the lateral sinus has added to the dangers of the operation, especially if my asepsis has been efficient. If one is dealing with a virulent infection to start with, such as a streptococcic infection, and has fortified the patient by having used a vaccine before operation and the aseptic measures at the time of operation are sound, no great risk is run in wounding the sinus, and this shows the importance of knowing the infective organisms before operating. If the sinus has been wounded, and it bleeds freely, this is advantageous, as it washes away the bacilli. It is well, therefore, to let the bleeding go on freely for a few seconds with this object in view. I avoid plugging the sinus in such cases, simply laying the gauze plug on the injured vessel, wait and apply pressure, and then proceed with the operation with this gauze held in position; this is left there as part of the dressing afterwards. Should but little or no bleeding occur on wounding the sinus, more serious consequences may follow, and it is best in such a case to slit up the sinus, freely scoop out any clot discovered, let free bleeding go on for a few seconds, and plug firmly both ends of the open sinus.

Mr. W. M. MOLLISON: Mr. Tod's cases are very interesting, and that kind of case is rare. He does not refer to cases of bleeding from the sinus in acute conditions, but to a sequel to damage during straightforward radical mastoid operations. They are not to be classed with those cases that Mr. Stuart-Low has mentioned. I have met with only one case, and that came on in the same way as Mr. Tod has told us, ten days after the operation. The patient left the hospital apparently well, and within twenty-four hours she returned with typical symptoms of lateral sinus thrombosis, and in spite of the fact that operation was at once performed and the jugular vein ligatured, she died.

Mr. CHARLES HEATH: I have had only one such case. It was an acute one. I was removing the mastoid bone with a gouge and mallet when a large piece of softened bone broke away and the rough edge of it damaged the sinus. The hæmorrhage was pretty severe, but I plugged in the way mentioned by Mr. Tod (that is, I made the two sides of the sinus come together), and left the plug in for two or three days. Then I removed it; there was no hæmorrhage, and I inserted another. The case did well on removing the second plug.

The PRESIDENT: I suppose I must have wounded the surface of the lateral sinus many times. One sees the sinus frequently of course, but only three times have I seen bleeding from the sinus as the result of an accident during the operation. None of those cases became septic. On the other hand, in one case, during the curetting of the floor of the tympanum in the course of the radical mastoid operation, removal of the granulations resulted in septic thrombosis of the bulb of the jugular vein, though there was no excessive bleeding. The characteristic symptoms set in about the ninth or tenth day: the patient was up and about, and was shortly to be made an out-patient. Fortunately, recognizing that the septic thrombus was in the bulb, I tied the vein at the first operation and the patient recovered. As Mr. Mollison has said, injury to the lateral sinus seems seldom to result in sepsis—presumably because the sinus is freely exposed and the drainage is good. The last case of wounding which happened in my practice was acute influenzal apical abscess. There was a tremendous gush of blood, and I put a gauze plug covered with B.I.P. over the bleeding spot, but not into the sinus. A week afterwards the plug came out easily, without any hæmorrhage. There had been no rise of temperature nor other symptom of thrombosis.

Mr. HUNTER TOD (in reply): I agree with those who say this is a rare accident, but I thought it worth while to give my clinical experience: especially to emphasize the point that infection of the lateral sinus after the radical mastoid operation may give rise to no symptoms for about ten days, and that this fact should be recognized in order that on the occurrence of such symptoms further operation should at once be undertaken. As I have already stated, I have only had four such cases during a period of eighteen years on the staff of the London Hospital, a proportion of less than one in two hundred cases operated on. With regard to Mr. Stuart-Low's remark as to sepsis, I am of opinion that the sinus is infected at the time of the primary operation when the field of operation—a septic cavity—is swarming with micro-organisms. The ten-day interval corresponds approximately with the period of time at which embolism occurs after child-birth or after an operation on the appendix, or even on the knee-joint, perhaps with an immediate fatal result. This interval apparently is the time taken for the clot to become septic and to disintegrate, although I have never seen the fact stated. In my opinion all such cases are the result of septic infection of a vein. In answer to Dr. Banks-Davis, I inserted a gauze plug between the wall of the sinus and the bone so as to obliterate the sinus. I leave the plug in three days and then take it out. If bleeding occurs I insert another plug of gauze and leave it a further three days, and repeat until there is no further hæmorrhage on removal of the gauze—in some cases a matter of two weeks or longer. During the changing of the gauze plug the patient should keep as quiet as possible and avoid coughing.

Section of Otology.

President — Mr. HUGH E. JONES.

Particulars of a Case of Vertigo; Labyrinthotomy; Obliteration of the Semicircular Canals and Part of Cochlea by Bone.[1]

By RICHARD LAKE, F.R.C.S.

A. B., SAILOR, aged 23. This patient was shown at the conjoint meeting of the Sections of Ophthalmology, Neurology, and Otology, in order to show how in some cases one was absolutely unable to demonstrate nystagmus. He was admitted under me at the Seamen's Hospital on account of his severe vertigo. He was absolutely deaf on the right side and extremely hard of hearing on the left. His giddy attacks were very frequent and very pronounced, in fact, he had fallen overboard four times.

This patient was operated upon with a view to opening up and destroying the posterior half of his labyrinth on the right side. I was absolutely unable to find the external canal, and cut backwards trying to find the posterior, which also I failed to find, but after a considerable amount of trouble was able to locate the vestibule as quite an insignificant cavity much smaller than usual. As the patient suffered very severely from tinnitus, I attempted then to clear out the cochlea, but was quite unable to remove the front wall, the whole cochlea being apparently one solid mass of bone, so much so that all I did after having cut away for some length of time at the cochlea was to drive the whole mass into the internal auditory meatus, setting up a free flow of cerebro-spinal fluid. The patient was apparently very much benefited as far as his vertigo was concerned, but the case is reported as an example of the obliteration of the semicircular canals, and at any rate part of the cochlea by bone.

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[1] At a meeting of the Section, held March 21, 1919.

This case was withdrawn at the time that I had it down for discussion (May 15, 1914), as the patient had suddenly become very ill. Unfortunately, the case terminated fatally. I had intended bringing it forward with a complete pathological report. The war so upset everything, however, practically everybody connected with the hospital leaving, that I have been unable to find the temporal bones, which I know were saved. I have at last given up all hope of finding them, and am therefore bringing forward the case without any pathological report. As far as I can make out, the patient died purely from neglect of antiseptic precautions. I must say I do not think that I can exculpate myself from a considerable amount of responsibility, as I was unable to get down to the hospital as often as I should have done to look after the case.

Epithelioma of the Left Auricle after Operation (Specimen of Ear removed shown).

By W. STUART-LOW, F.R.C.S.

J. B., A MAN, aged 45, a warehouseman by trade, was shown at the November meeting, 1918, the case being recognized as a very rare condition—viz., malignant disease supervening on a surface affected for many years with lupus erythematosus.

Radical removal of the ear, including the entire cartilaginous and membranous auditory meatus, was performed on November 25 last. The method of operation was as follows: A long incision was carried down the length of the retro-auricular groove and extended upwards over the temporal region for 3 in., and downwards over the parotid region for the same distance. Another incision, almost at right angles, but sloping downwards somewhat, was carried backwards for 3 in. from the middle of the first incision. Two flaps of skin were now raised and turned upwards and downwards, and the glandular structures underneath thoroughly cleared out above, behind, and below the ear, the exposed surfaces being then thoroughly scraped with a sharp spoon and a solution of 40 gr. to the ounce of chloride of zinc well rubbed over the exposed tissues and bone. This very effectively checked the free bleeding which took place, and was also used with the object of destroying stray cancer cells, and setting up a healthy inflammatory action. The entire meatus—cartilaginous and membranous—was then forcibly evulsed, and the walls of the meatus scraped, and the solution of zinc applied. The skin in front of the ear was then reflected by an incision from the attachment of the auricle above to that of the lobule below. This anterior flap of skin being raised the pre-auricular glands were removed, and the surface scraped, and the same solution applied. The flaps were stitched in position, a thick rubber tube being fixed in the meatus. The parts have healed perfectly, and it is interesting to notice that the scaliness of the skin is now much less, as perhaps the lotion so freely and frequently used in the after-treatment—viz., liq. hydrarg. perchlor. 1-2,000—has helped to restrain it and improve the tone of the tissues by lessening the latent tuberculous infection. The blending of two dyscrasiæ, tuberculosis and cancer, in the same situation, is not the least interesting point of this case.

A Female with Fibroma of the Auricle at the Entrance of the Meatus.

By W. STUART-LOW, F.R.C.S.

PRESENT for years—very slow growth, and only recently given trouble.

Vertigo: (?) Labyrinthine or Cerebellar.

By JOHN F. O'MALLEY, F.R.C.S.

LANCE-CORPORAL W. R., aged 35. Knocked down by a bicycle in December, 1914. "Fracture of the skull" was then diagnosed. He was seven days unconscious and five weeks confined to bed. He complains of the following symptoms since :—

(1) Noises in the left ear, by day and night (like steam escaping).

(2) Giddiness. More unsteady in the dark than by daylight, in the morning and the evening than other parts of the day. When walking, he tends to go to the left and "bumps" into anybody who is on this side of him. He also falls off the kerbstone to the left.

Examination.—(1) Membranes intact, with good lustre, and no lesion seen.

(2) Nystagmus: on looking to the extreme left half a dozen flickers can be elicited.

(3) Equilibrium. (*a*) Romberg's test. Standing erect, eyes shut, unsteady, but no tendency to fall in any definite direction. (*b*) Babinski-Weil test.

February 20, 1919: He went very definitely to right and progressed in this direction each time he crossed the room. Treated for fourteen days with 3-minim doses of liq. strychnini hydrochlor. and 10-minim doses of acid. hydrobrom. dil., thrice daily. This was discontinued, as he complained that it made his heart palpitate.

March 6, 1919: Gait unsteady, swaying to left, but did not move round from direct line between two points.

(4) Caloric test: Cold, at tap temperature; four pints, reservoir 2 ft. above ear. (*a*) Nystagmus: no perceptible alteration. (*b*) Romberg: same. (*c*) Babinski-Weil: slightly more unsteady; sways to right and left, but decidedly more to the left; says he feels more unsteady.

(5) Hearing: Has made no complaint of deafness. Right ear, good; left ear, hears forced whisper at 10 to 12 ft.

(6) X-ray report: "Small fracture, above and behind left mastoid air cells, about half an inch long." It cannot be seen extending into petrous portion of temporal bone.

Are the present symptoms labyrinthine or cerebellar?

Exhibitor will be grateful for suggestions as to treatment.

Demonstration on a New Theory of Hearing.

By Sir THOMAS WRIGHTSON, Bt., and Professor ARTHUR KEITH, M.D., F.R.S.

Professor ARTHUR KEITH, M.D., F.R.S.

THE theory is Sir Thomas Wrightson's; I am merely responsible for the application of the theory to the anatomical details of the inner ear. The new theory was outlined by Sir Thomas Wrightson in a presidential address given to the Cleveland Institution of Engineers in 1876, but it was quite over-shadowed by the glamour attached to the theory and name of Helmholtz. According to the Helmholtzian theory the internal ear is a sort of microscopic piano, furnished with resonating strings, almost ultra-microscopic in size, and some 16,000 in number. Each string or set of strings is supposed to pass into a state of vibration when its sympathetic note enters the ear. Each string or set of strings is supposed to have a corresponding nerve-fibre, and we must suppose that these nerve-fibres lead ultimately to a central nerve-cell station or exchange, where 16,000 nerve-cells receive messages from their corresponding ear strings. However satisfactory from the point of view of a physicist, Helmholtz's theory of the ear from the point of view of a psychologist, physiologist, or an anatomist, is an impossibility. The strings are there but they are so placed and so conditioned that the one thing they cannot do is to vibrate; Nature has taken the utmost care to render individual vibration an impossibility. In Sir Thomas Wrightson's theory the ear acts as a single machine; it is the most minute and most delicately adjusted spring balance ever evolved or invented—one designed not only to weigh the simplest and slightest sound wave but also the most complex and voluminous. The ear not only weighs every fluctuation in pressure but automatically registers and records the minutest variation, and through the hair-cells or semaphores which form an intrinsic part of the machine the system of messages or semaphoric signals transmitted from the ear may be compared to the dot and dash system of the Morse code; the whole of the organ of Corti is involved in the production of this code of signals; all the fibres of the auditory nerve are concerned in its transmission from the ear to the brain. It is a legitimate inference to suppose that the time signals carried on this code can be deciphered and be sorted out at nerve synapses in the central nervous system. Thus Sir Thomas Wrightson's theory brings hearing into line with smell, taste, sight and touch, whereas Helmholtz's theory, by presupposing that each fibre in the auditory nerve has its special function, breaks the most elementary law we know regarding the nature of nerve constitution.

Recent advances in our knowledge of the evolution of the internal ear throw a most definite light on the mechanism of the cochlea and organ of Corti. The ear has been evolved from the balancing apparatus of the primitive labyrinth; the principle which has been adopted by Nature in working out the organ of hearing is merely an extension of the principle used in the primitive labyrinth. In the lowest fishes a closed vesicle on each side of the head, filled with fluid, serves as the central part of the labyrinth; on its floor is a nest or island of hair-cells. On the hairs is balanced an otolith; nerve fibrils commence in or round the hair-cells. So long as a fish swims on an even keel the ciliary semaphoric system is at rest; but if it heels over, ever so slightly, then gravity comes into play; the otolith as it answers to gravity bends the hairlets right or left, as the case may be, and on bending the hairlets sets up certain tensions or changes in the living cells to which they are attached, and these changes are transmitted as signals or impulses along the attached nerves. In this simple semaphoric apparatus there are four elements: (1) the otolith or *titillator*; (2) the hairlet or lever on which the titillator acts; (3) the sense-cell on which the lever acts; (4) the nerve-fibres which are acted upon or stimulated by the sense-cells. In the sense organs or signal stations of the semicircular canals which have been evolved for the registration of body-movements we find the same four elements. The cupola represents the titillator, but it is no longer acted upon by gravity but by mass movements of fluid set up in the canals during movements of the head. Barány was the first to show that movement of the fluid in one direction gave one set of signals; movement in the reverse direction another and reverse set of signals. With the evolution of the cochlea and the organ of hearing the same four elements were used. The titillator is the tectorial membrane; the hairlets or levers, the sense-cells and nerves are as before, save that the sense-cells are now set in an elastic scaffolding of fine elastic rods and fibres. But one novel change has been introduced; in the balancing apparatus of the vestibule the sense cells are fixed; the titillator is movable. In the cochlea Nature has reversed the arrangement and set the sense-cells on a movable membrane—the basilar membrane, which responds to every displacement of fluid set up by waves of sound impinging on the inner ear. On the other hand, the titillator is no longer free but is tethered to the containing wall. Thus in the utricular system the hairlets or levers are worked by gravity; in the canalicular system, mass displacements of fluid set up by movements of the head bend the levers and give rise to signals; in the cochlea the force employed in working the lever system is the minute displacements set up by sound waves, and the levers are bent by the field of hair cells working against the titillator or tectorial membrane.

The essential modifications required to make the otic vesicle into an organ of hearing are (1) a closed vesicle, filled with fluid and everywhere surrounded by bone of a peculiarly dense nature—all except at one area—where a minute window—the fenestra rotunda—is established. That window is essential, without it there can be no mass displacement of the fluid and no hearing as sound waves sweep through the bony walls of the vesicle. In the passage leading to that window is placed the organ of Corti—the apparatus for recording the displacements of fluid set up by the bone-conducted sound waves. To make the ear a more sensitive machine another window is established in the bony wall of the vesicle—the fenestra ovalis, into which is fixed a movable piston, the stapes. By a bent lever, formed by the ossicles of the ear, this piston is yoked to the membrana tympani, and thus the ear is rendered infinitely more sensitive to sound impulses carried by the air. Closure of the fenestra ovalis, by fixation of the stapes, renders the ear more sensitive to bone-conducted waves; closure of the fenestra rotunda produces complete deafness; these facts cannot be explained on the hypothesis put forward by Helmholtz, but find a complete answer from the theory put forward by Sir Thomas Wrightson.

Four phases are to be recognized in the completed movement of the lever or hairlet of a sense-cell. Its upright or vertical position may be regarded as one of rest—its zero position. In the first phase of a complete movement the hairlet bends towards one side—towards the right we shall suppose; in the second it returns to its upright or zero position; in the third it bends towards the left; in the fourth it again returns to its starting or zero point. It is clear that different conditions of tensions and pressures will be set up within the hair cell in each of these four phases, and each phase we may postulate gives rise to a nerve impulse or signal; the signals set up will vary with the duration and force of each hairlet movement. In each sound wave Sir Thomas Wrightson recognizes four corresponding phases: two of these lie in the part of the wave where the air particles are being condensed—the part in which there is a *plus* pressure; two of them lie in the part where the air particles are being rarefied—where there is a *minus* pressure. In phase I the plus pressure is rising; in phase II the plus pressure is falling; in phase III the minus pressure is increasing; in phase IV the minus pressure is decreasing.

Sir Thomas Wrightson's original discovery, announced in 1876, was the recognition of the fact that, if it could be supposed that each phase of a sound wave did give rise to an effective stimulus in the ear, then the brain was supplied, through the ear, with a sufficiency of data to give a complete analysis of the most complex sound. Helmholtz had supposed that such an analysis could be accomplished only on the principle of resonance; Sir Thomas Wrightson showed that there was an alternative method.

That each phase of a sound wave is effective in producing a distinctive movement of the auditory hairlets was a later discovery, but formed a very essential part of Sir Thomas Wrightson's theory. It was a sequel to a neglected discovery of Sir William Bowman's, made somewhere about the year 1846, that the basilar membrane is made up of two parts—a striate zone and a hyaline zone; the hyaline zone resembles the capsule of the lens in structure and in staining reaction, and must be regarded as elastic in nature. Sir Thomas Wrightson has demonstrated that the displacements which sound waves set up in the fluids within the ear act against the elastic resistance of the basilar membrane, and that thus, each of the four phases of a sound wave, which he had originally postulated on theoretical grounds, do thereby become effective in producing a separate and distinctive movement of the hairlets. In my opinion the various parts of the cochlea, of the organ of Corti and the conformation of the various liquid passages of the ear, which were left unaccounted for on Helmholtz's theory, now receive a satisfactory explanation. I have no doubt that when physiologists, psychologists, and aural surgeons have mastered the details of the new theory they will find themselves provided with clues to phenomena which were formerly inexplicable.

Sir THOMAS WRIGHTSON, Bt.

From Professor Keith's remarks no idea can be gathered how much is owing to him in the presentation of this theory of hearing. As a distinguished anatomist who understands every detail of the parts involved he grasped the idea that if a machine was required to transmit the varying pressures of a sound wave to the nerve terminations that transmission must be of a dead beat character. In the cochlea this transmission, according to the theory, is conveyed from the comparatively large area of the outer drum on which the air-pressures act through the bent levers of the ossicular chain to the smaller area of the stapes. The stapes is about one-fifteenth the area of the drum, so that according to a principle well known to hydraulic engineers the unit-pressure is increased in the proportion of 1 to 15 in the cochlea, and a further increase is effected by the leverages of the ossicles. These increases in pressure imply a corresponding decrease in displacement of the stapes.

By the laws of equilibrium in fluids, demonstrated two hundred years ago by Pascal, we are bound to admit that every momentary change of unit-pressure in the air-wave would be thus multiplied considerably in the liquid of the cochlea between the stapes and the basilar membrane. And these varying unit-pressures are instantaneously carried throughout the whole of the cochlea above the basilar membrane. If two separate pistons are placed in a cylinder with liquid entirely filling the space between them, pressure on the left piston will be transmitted right through the intervening fluid and move the second piston exactly as though a solid connexion existed between the pistons; and this is also true, however the area of the passage between the two pistons may vary, so long as the total space between the two pistons is entirely occupied by fluid. We shall see that the transmission of pressure through the cochlea is sometimes by displacement of fluid and sometimes by the action of levers, but the effective units of work impinging on the drum membrane are all to be accounted for in the bending of the hairlets or nerve termination, so that a dead-beat transmission of power exists from drum to hairlet.

The basilar membrane is tapered in breadth from *nil* at the fenestral end to a maximum at the helicotremal end. One-fourth of its breadth throughout its length of 35 mm. is highly elastic while the remainder is inelastic and rigid. The inelastic part is hinged along one of the sloping sides of the tapered opening which forms the frame of the whole membrane, and the elastic or subarcuate zone is hinged on the opposite sloping side. When, therefore, the pressure comes upon the whole surface of the membrane a triangular prism of liquid is displaced which at each moment is exactly equal to the displacement of the stapes. To the inner edge of the pectinate or rigid zone are attached the inner legs of the Corti arches, and as the outer legs rest as a hinge or pivot upon the sloping edge of the tapered aperture to which the elastic zone is also attached the up and down motion of the membrane causes the apex of the Corti arch to move transversely to and fro. As the pressure and therefore the motion is *nil* at the fenestral end no motion is transmitted at that point, but as the arches approach nearer the helicotremal end of the basilar membrane, the pressure and displacement, and therefore the transverse motion of the apices of the arches, increase to a maximum at the helicotrema. The whole of the up and down motion of the basilar membrane is carried into the bent levers of the Corti arches where it is once more carried through rigid levers.

From the apex of the Corti arches the pressures pass into the reticular membrane which carries the hairlets. The upper ends of the hairlets penetrate the surface of the tectorius, and the to-and-fro transverse motion of the reticular membrane causes a bending of the hairlets and such bending will be in proportion to the reactionary pressure at the tip of the hairlet resting in the tectorius.

The basilar membrane being thirteen times the area of the stapes the total pressure will, at each moment of time, be thirteen times that on the stapes, according to Pascal's law, but this pressure and displacement divides itself, as explained, from *nil* to a maximum over the whole length of the basilar membrane, and the bending of each elastic hairlet is the measure of the pressure between its end and its contact with the tectorius according to its position in the whole length of the basilar membrane. The resistance of the elastic portion of the subarcuate zone and of the deflecting hairlets and other portions of bending solids in the cochlea act in accordance with the laws of elastic solids as demonstrated about two hundred years ago by Robert Hooke.

The difference between the pressure of the sine wave and that of the combined Hooke resistances causes a change in the residual curves and introduces indications of fresh impulses in the four phases of the sine curve.

Diagrams are shown of the resultant curves of pressure in the liquid of the cochlea and in these the time positions of the impulses are seen to coincide not only with the well known time positions of the simple sine wave forms but of compounded tones where the time positions of the differential tones, the summational tones, the octaves and other harmonies are revealed, all being confirmatory of the theory.

The residual time-pressure represented by the final liquid curve has to reach the brain by some process. I suggest that this may be explained if we assume a nerve current always passing through the point where the hairlets and tectorius meet.

Professor Hughes' great discovery of the action of the microphone shows that where an electric current is passing through a circuit in which a slender point of contact is subjected to the varying pressures of a sound wave, the sound wave is transformed into an electric wave, which after passing through a telephone wire to a receiving telephone can then be reconverted into a sound wave. Such a condition is perhaps worthy of the consideration of physiologists as a means of carrying the wave form to the brain.

DISCUSSION.

The PRESIDENT: One point which occurred to me is the question of bone conduction: I am not quite clear on that point. The fact of the stapes being absolutely fixed, and possibly the foramen rotundum also being closed, would, I presume, convert the canal into a rigid, inelastic body, and it is difficult for me to understand exactly how the mechanism described acts when the only means of the conduction of the sound waves is through the bone. Are all the waves arriving by bone conduction synchronous and do they not cause mutual interference?

Sir ROBERT WOODS: I have studied the Helmholtz theory, and while one could not help acknowleging the great weight due to so accomplished a physicist, I confess I never had a really intelligent grasp of his theory, perhaps because, as I think now, the theory is wrong. But it is quite otherwise with the theory which Sir Thomas Wrightson and Professor Keith have now laid before us. The way in which Professor Keith co-ordinated the relations between the stimuli which are received by the auditory nerve as static stimuli, and auditory stimuli, was very elegant. We need have no difficulty in accepting the same kind of stimulus, that is, a purely mechanical stimulus, producing two entirely different effects, because the question of why one is translated as a sensation of movement, and the other as sound, is a matter for the psychologist to study. Whether he will ever arrive at a reasonable theory on the subject is another matter. I am not quite certain if I correctly followed Sir Thomas Wrightson in his statement with regard to movements owing to different pressures on the basilar membrane: I was not sure whether I was not mixing them up with tensions, that is, reserving the word "pressure" strictly for what goes on in the fluid, and "tension" for what goes on in the membrane. If we use those terms indiscriminately, it leads to confusion. [Sir THOMAS WRIGHTSON: I referred to total pressure.] With regard to bone conduction, I do not think that need present much difficulty. I presume the President referred to those cases of otosclerosis in which the stapes was fixed, and so forth. But if you have got bones in a state of vibration, it must shake up the internal nervous mechanism of the ear by agitating the intracochlear fluids, and then there must result a sort of movement between the hair-cells of the organ of Corti and the titillator.

Professor KEITH: With regard to bone conduction, I think we obtain therefrom a strong support for the theory of Sir Thomas Wrightson. I can best show it to you by a diagrammatic section across the ear. In demonstrating the evolution of the ear, I have shown you that the only opening which is necessary for hearing is the fenestra rotunda: the fenestra ovalis is not necessary. In certain conditions in which the stapes gets fixed, or where there is disease of the middle ear and the drum is perforated, pressure on the stapes to keep it firm improves hearing. Under the Helmholtz theory you cannot get an explanation of that fact, but Wrightson's theory gives you exactly what you want, and in this way. Supposing you have no drum, but sound waves are passing through the petrous bone, you will have compression and rarefaction of its contained cavity as the sound waves pass through. During compression, the fluid displaced will find relief at the fenestra ovalis and hence never act on the basilar membrane at all. But if you fix the stapes, all the displacement must go towards the fenestra rotunda and must thus act on the basilar membrane organ of Corti. If, on the other hand, the fenestra rotunda is blocked there will be no hearing. I do not think anyone has come across a patient who could hear with both fenestræ blocked. On Helmholtz's theory ought we not still to be able to hear even if both ovalis and rotunda are blocked? I do not see why a cord should not vibrate inside a closed cavity.

Professor ALBERT GRAY: It is common, in discussing most theories of hearing, to speak of the labyrinth as a closed cavity, but in some animals it is far from being such, the aqueduct of the cochlea being a wider opening into the labyrinth than either the oval window or round window. Another difficulty I have in accepting this theory is from the point of view of the physiologist. Helmholtz's theory, we know, cannot be right, but the theory can be modified. Professor Keith objects to the difficulty of single fibres, or one or two fibres, vibrating independently of the membrane. The whole membrane can vibrate so long as there are maximum points of vibration.

But my difficulty with the theory is chiefly on physiological grounds, and it is a difficulty which many have felt. The more we think of it, the more difficult it becomes. I refer to the transmission of nerve impulses. By Sir Thomas Wrightson's theory, and Rutherford's telephone theory, we are asked to believe that nerve-fibres can transmit these sound vibrations, varying in rate up to 30,000 or 40,000 per second up to the brain without fusion, at any rate in the middle parts of the scale. These vibrations have not only to succeed one another without fusion, but they have to pass through the ganglion spirale and through the ganglia in the medulla, then to pass on to the cortex cerebri, where the brain cells have to analyse them. That is taking only a simple harmonic tone. What, then, must we think of it when we come to the analysis of two or a number of these simple tones compounded together? We have to have a nerve-fibre conveying these without fusion, and also conveying impulses of which no two in succession are alike, with absolutely exact correspondence to the sound impulses which produce them. These impulses must pass through the cells of the ganglion, through the fourth ventricle unchanged, and up to the cells of the cerebral cortex. And we are not done with it even there. The impulses, when they get to the cerebral cortex, are still compound, and they have to be resolved by the brain cells into stimuli corresponding to simple harmonic sounds. We have no evidence that such phenomena can occur in nerve tissue, and all the evidence that we have points in the opposite direction. Thus, physiological experiment has shown that the minimum time for a nerve-impulse to pass from an afferent fibre into a nerve-cell and out again by the efferent fibre is 0·003 second. That is to say, that the maximum number of nerve-impulses which can pass into and out of a ganglion cell (bipolar) is 333 per second. It may be that more recent investigations have proved these experiments to be fallacious, but I do not know of such. And if they are correct, then it is difficult to see how one can accept any theory of hearing that depends upon tone analysis in the brain.

Sir Thomas Wrightson has made his theory appeal to us by the clearness of his explanation, but I do not think any theory we have at present will prove quite correct, though I believe some modification of some of them will. We do not yet know enough about the physiology of nerve conduction. As far as the transmission of sound impulses to the tectorial membrane is concerned, I might agree with him; but where I should join issue with him would be as to the place where the analysis takes place. My inclination is to the view that it takes place in the cochlea, not in the brain.

Mr. WAGGETT: The simple cochlea in the bird was a difficulty under the Helmholtz theory. Has Sir Thomas Wrightson examined it in connexion with his theory?

Professor KEITH: I have devoted considerable attention to the question of the bird, and the bird's ear gives the strongest support to Sir Thomas Wrightson's theory: it answers all the postulates. I should like to refer also to one or two of the important matters raised by Dr. Gray concerning the rate of conduction of nerve stimuli. Professor Bayliss has already discussed the matter. It astonishes me to suppose that those of us who are so accustomed to listening over the telephone and getting all the modulations of the speaker's voice accurately brought through, can think that Nature could not do what man has done successfully. What reason have we to suppose that messages cannot come and be received by the hundred thousand? Even on Helmholtz's theory, where each vibration knocks the cilia against the tectorial membrane, we must presume that 16,000 messages can pass per second along the same fibre. If you sound a note with a vibration frequency of 15,000 per second, you must have 15,000 impulses on the resonance theory.

Mr. SYDNEY SCOTT: It is a great pleasure to hear Sir Thomas Wrightson and Dr. Keith on their hypothesis, but aural surgeons meet with many conditions which seem to present stumbling blocks to the acceptance of this theory even in its present form. Supposing we accept the conception of the four phases of the sound wave which Sir Thomas Wrightson has clearly described, and of course admit that the wave is transmitted by air in the external auditory canal to the intact tympanic membrane, thence by the ossicular chain to the footplate of the stapes and the perilymph. What is happening to the membrana secundaria? Sir Thomas Wrightson and Dr. Keith believe that the membrana secundaria moves outwards in response to the first compression phase which causes the stapes to move inwards and conversely when the stapes moves out in the second and third phases that the membrana secundaria moves inwards. Are we then to consider that the tympanic membrane throws a sound-shadow in the tympanic chamber? Can we accept the view that although the drum-head moves too and fro, there is no wave imparted to the air in the tympanum? Personally I cannot abandon the belief that the sound wave is transmitted simultaneously to ossicular chain and tympanic air, and so that it acts through both fenestræ of the labyrinth; thus there would be a double compression through the perilymph of the scala tympani and scala vestibuli and across the endolymph to the essential structures for the reception of the sound stimulus. I think Mr. Jenkins will agree that our knowledge of the structure of the membrana tectoria was greatly advanced by Hardesty's researches. The relationship of this important structure to the cilia of Corti's cells is most suggestive that the essential mechanism is represented by changes in the contact tension between these two structures, a view which has been upheld on previous occasions.[1] But before we can accept any new theory we really require new data. For instance, to mention one anomaly, we know that fixation of the stapes alone will cause defective hearing but does not prevent the essential sound stimulus when transmitted by sound waves of sufficient energy by air and bone conduction. The whole gamut can be transmitted by bone conduction, as the monochord has shown. Moreover, I have observed two patients who presented well-marked classical signs supposed to be characteristic of unilateral fixation of the stapes, in whom I found the whole ossicular chain and drum absolutely normal, in the course of an operation in each case designed for the relief of intolerable tinnitus, an operation which we abandoned some years ago. The stapedes were mobile, and free from microscopic abnormality. Yet the hearing tests gave the same results as those met with in cases of immobile stapes. I think we must give more attention to the fenestra rotunda.

[Mr. SCOTT showed a photograph of a radial section of Corti's cells, in the human subject, which was previously illustrated in the *Proceedings*.[2]]

Sir THOMAS WRIGHTSON: The fenestra rotunda goes out with exactly the same displacement as the other membrane goes in. In a hydraulic engine the liquid exhaust of the engine has exactly the same cubic displacement as the high-pressure liquid which does the work; but, the work being done, the exhaust goes out at the reduced pressure, reduced in equivalence to the work done. The cochlea is in fact a minute hydraulic engine, which transfers the units of work from the air waves which fall upon the outer drum to the hairlets at the nerve terminations.

Mr. RICHARD LAKE: In all these theories I have wondered why no one has considered the ossicular chain as an accommodating mechanism in the conveyance of sound. We can get on well without any of the ossicular chain.

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[1] Arris and Gale lecture, Royal College of Surgeons, 1910.

[2] "Discussion on the Value and Significance of Hearing Tests," *Proceedings*, 1911-12, v (Sect. Otol.), p. 107.

When Botey first removed the stapes from animals he found they could hear well without it; the stapes was removed in a large number of cases by Jack, in America, and hearing was often improved. Still, one cannot help feeling that the ossicles are there for some purpose. If we are prepared for a sudden sound, its occurrence causes us much less inconvenience. In listening intently for fine distant or delicate sounds one can undoubtedly hear more distinctly, and I believe the function of the ossicular chain is also partly for protection, as well as partly as an accommodating mechanism. The head of the stapes is practically hollow, with a central pin, and such arrangements are for the prevention of shock arriving at the vestibule. The drum itself is of no importance in hearing, it is to keep the whole middle ear moist so that sound waves can pass well through it. The stapes may be fixed in scar tissue, so that it is all one mass, yet if one makes an artificial drum, with a little cotton wool to which vaseline has been applied, the improvement in hearing is enormous. Until we settle how sound waves get into the middle ear we shall not make very much progress in the physics of hearing as applied to the cochlea.

Dr. W. HILL: Are we to understand that that very complicated apparatus, the auditory portion of the labyrinth, is of no use as an analysing organ? As far as I can understand from what Professor Keith said, what he means is, that the labyrinth, as such, may be set aside, as taking no large part in the function of hearing. We should be told plainly if that is what the openers of this discussion mean. Surely the complicated cochlea is as much a functioning apparatus in this new theory as in the Helmholtz theory? It seems that we might as well have had the open auditory apparatus of the crustacean, a cavity furnished with hairs and filled with sea-water containing a few grains of sand. I do not think there is anything inherently improbable in the alternate condensation and rarefaction idea, but surely that does not dispense with the complicated analysing apparatus. That is to say, I agree with Professor Gray, that probably the elaborate mechanism in hearing such as goes on in a highly musical person, must depend on the labyrinth. In spite of its delicacy, it is the last part of the ear to suffer from disease. It is only in mumps, syphilis, and a few diseases like that, that we find serious disorder of this complicated organ of Corti. I have long held the view expressed by Mr. Lake, that part of the hearing function is not only conduction through the ossicles, but aërial conduction across the tympanum to the membrana secundaria. That seems to offer difficulties in the acceptance of any theory advanced up to the present.

Dr. DUNDAS GRANT: I do not known whether Sir Thomas Wrightson's theory carries us the whole length that we might wish, but his exposition of the mechanics of the cochlea seems absolutely convincing. I do not think there had ever been such a clear exposition of it until he published his views. Something similar was published by ter Kuile in 1900, but Sir Thomas Wrightson appears to have antedated that. How does he explain differences in pitch.[1] Ter Kuile thought it depended on the distance up the cochlea to which the waves ran. I think that is doubtful: it is difficult to understand. And one of the difficulties one has felt in regard to Helmholtz's theory has been that one has tried to imagine the waves running up the scala vestibuli, round the helicotrema, and down the scala tympani: whereas a movement must take place at the base of the cochlea long before that, with a displacement of the membrana basilaris, which is communicated to the fluid beneath it, there being a safety valve in the membrane of the fenestra rotunda. Sir Thomas has explained very well the significance of the comparative areas, of the membrana basilaris and the fenestra ovalis, and it is a most ingenious idea that the pressure is equalized all the way up, by the basilar membrane being wider at the part where naturally the pressure of the fluid has become almost extinguished, namely, at the apex. I think that is a basis of truth which will stand firm in all theories. Mr. Scott has suggested that considerable air-pressure is exercised on the fenestra rotunda from the tympanic cavity which should neutralize pressure from the inside of the cochlea, but I think that pressure conveyed through such a compressible medium as air is not comparable to that through such an incompressible medium as water. Pressure through the fluid medium must be infinitely greater than that through a gaseous one. Mr. Lake has spoken of splendid hearing being retained without tympanic membrane and ossicles. If those parts are not in excellent functioning condition, hearing is far better without them, though not so good as when they are in good condition, as probably Mr. Lake will agree. Zimmerman pointed out how hearing is conveyed through bones, and Mr. Lake has referred to the great value of the artificial drum. But I am convinced that when the artificial drum is placed on the stapes a better effect is produced than when it is placed on any other part of the labyrinthine wall, unless indeed the round window. What its exact function is, it is difficult to say. I think that if the plate of the stapes is mobile it takes up the vibrations and conveys them to the stapes, but in any case the hearing is best when the artificial drum is on the stapes. We are very much indebted to Sir Thomas Wrightson for the light the theory sheds on hearing, so far as it goes, but, as he himself says in his book, there is still a vast hiatus in our knowledge of the conveyance of sound through the cochlea to the brain.

Mr. JENKINS: I should like a definite statement as to whether this theory is based upon a mass movement of the fluid in the cochlea, or not. I think we should have that decided, because everything depends on it. I found so much difficulty in fitting in any mass-movement theory of hearing that in 1913 I decided it was a molecular movement in the labyrinth which would form the basis of a theory of hearing. Mr. Lake and Mr. Scott have already voiced two or three of my objections to the present theory. One was that when the stapes is removed and there is only a thin membrane in its place, there may be good hearing.

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[1] I omitted to ask Professor Keith and Sir Thomas Wrightson how we are to explain the selective areas of degeneration in the cochlea produced in guinea-pigs by exposure to sounds of various pitch.

Mr. STUART-LOW: One of the most important factors in the transmission of sound waves across the conducting apparatus to the inner ear is maintenance of a condition of plus pressure in the tympanic cavity—normally the pressure is always plus, and this keeps the tympanic membrane taut, a most essential thing for its aptness for appreciating the variations of pitch. When the pressure becomes minus the drum is pressed in and retracted on the ossicles, and middle-ear deafness begins with all its baneful consequences, such as tinnitus, &c. This paramount plus pressure depends almost entirely on the health of the Eustachian tube, and this largely on the mucous lining of the tube being normal. Should the mucous lining, which is specially thick at the lower part, become impaired and desiccated the efficient closure of the tube becomes impossible, and under such circumstances plus pressure in the middle ear disappears, with the result that the back door of the tympanic cavity, so to speak, is permanently ajar, the ossicles become fixed and motionless, and their powers of transmission lost. I believe that this impairment of these functions of the great ventilating shaft of the middle ear, which often commences so very insidiously, is very largely the cause of that bugbear of otology—middle-ear catarrh. Theories of hearing are very interesting, but for practical otologists the middle ear is the battle-field where the contest against deafness has to be fought and success won, if won at all. Once the inner ear is functionless nothing can be accomplished, and therefore for us its consideration is mostly scientific and technical rather than therapeutic.

The PRESIDENT: My difficulty is still very much the same, and I hope to have it explained now. This matter of the fixing of both foramen rotundum and foramen ovale: it does not satisfy me to say, as Sir Robert Woods said that "vibrations of a sort" reach the membrana basilaris: the theory demands a very regular and orderly movement of these delicate structures (the membrana basilaris and the organ of Corti); the wave lengths are transmitted, as Professor Keith said, in a sort of Morse code from this mechanism to the brain, very much, I suppose, as the wave lengths of light set going by the semaphore or heliograph are transmitted by the excitation of corresponding nerve stimuli through the retina to the brain. At the same time, I always feel that there is much more room in the brain for analysis of sound than is possessed by the much smaller and probably less highly organized nerve elements of the organ of Corti and ganglion spirale.

Sir THOMAS WRIGHTSON (in reply): One of the questions raised concerned the pressure of the air in the middle ear. The middle ear is connected with the external air through the Eustachian tube. When the drum of the ear moves inwards, the transmission of the wave form *here* (model) is through bony levers articulated together. You will see by this mechanism that the liquid unit pressure is increased in the cochlea due to the decreased displacement on the same principle as the Bramah press. With regard to bone conduction, this is derived from the air compressions and rarefactions acting on the exterior of the head, causing bone vibrations which are conducted to the walls of the cochlea. Whatever displacement of liquid is effected here must pass the basilar membrane, therefore the hairlets work through the action of that displacement if even the stapes is fixed. One speaker said he did not think nerves could pass along impulses of so many thousand vibrations per second as required under the theory. In answer one would ask, What about the telephone? Every sound and gradation of sound which a person speaks at one end is passed along the wire, so that every inflection and impulse of the voice is heard by the receiving ear. If, then, waves at this rate can pass through a copper wire, why cannot we conceive of a nerve taking the same number? Yes, the theory is based on the mass movement of fluid.

4h 14

Section of Otology.

President—Mr. HUGH E. JONES.

Case of Chronic Adhesive Otitis; Myringotomy and Partial Ossiculectomy.[1]

By P. WATSON-WILLIAMS, M.D.

MISS S. E., aged 26, came under observation in May, 1916, with deafness of several years' duration. Membrana dry, slightly opaque and thickened, only slight retraction, with dry adhesive catarrhal otitis (malleus immobile) Rinne negative.

When I first saw her she could hear whispered words uttered strongly (H.W.W.), right 28 in., left 20 in.; after Eustachian catheterization (H.W.W.), right 54 in., left 36 in. The sphenoidal sinus on the left side was found infected on exploration and was opened and the tonsils enucleated. The Gellé test proved positive, hence the conclusion that the stapedio-vestibular joint was not ankylosed. On September 20, 1916, crucial myringotomy was performed and later, October 17, the left membrana was more freely excised and the lower half of the handle of the malleus removed with the intention of making the perforation permanent. The beneficial effect of the operation as far as hearing was concerned was very distinct, H.W.W. becoming 24 ft.

The patient was shown at the meeting of the Section on November 17, 1916. At that time there was some middle-ear suppuration and the opinion was expressed by some members that the improvement in hearing was in part due to the suppuration and would not persist, and it was recalled that similar operative measures had often been tried in the past and abandoned as the improved hearing did not persist. The exhibitor promised to show the case after a year had elapsed.

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[1] At a meeting of the Section, held May 16, 1919.

It is now two and a half years since the operation was performed, but the beneficial effect on the hearing remains. It is noteworthy that it was the most deaf ear that was selected for operation. It was contended by the exhibitor that the temporary middle-ear suppuration was due to infection by the Eustachian tube from the infected sphenoidal sinus and with the cure of the sphenoidal catarrh the ear has remained dry and free from suppuration for over a year.

Now, H.W.W., right 5½ ft., left 25 ft.

DISCUSSION.

Dr. H. J. BANKS-DAVIS: Why has this operation fallen into abeyance, if it can produce a result such as this? The point Dr. Watson-Williams raises regarding sinus suppuration as a cause of a persistence of aural suppuration after even "well done" mastoid operations, is one of the greatest practical importance.

Dr. DUNDAS GRANT: I think these operations fell into disrepute because they were too often practised in cases which were really instances of sclerosis of the middle ear. In the present case there was no stapedio-vestibular ankylosis, and Dr. Watson-Williams took a reasonable way of excluding that. Although there are differences of opinion as to the value of Gellé's test, it should be used before operating. With regard to the influence of the disease of the sinuses, I think it was very considerable, as in other forms of purulent catarrh of the nasopharynx. Often, in the cases of radical mastoid operations in which the discharge persists it is because disease remains in the nasopharynx, not in the petrous cells. The patient "blows his nose" into his ear, and if attention is given to the nasopharynx and astringents injected into the Eustachian tube—I use collosol argentum, or a weak solution of chloride of zinc—the condition often clears up. Another reason why the operation is not now generally practised is that it has been found that when there is no ankylosis of the stapes, considerable improvement will take place as the result of inflations or injections, and of gymnastic massage of the ossicles. This case is a very encouraging one.

Mr. CLAYTON FOX: What was the condition of the Eustachian tube in this case? Seeing there has been such a marked improvement, it is possible the tympanic orifice to the Eustachian tube was occluded. After atresia of the tube, and with distinct pressure on the stapedio-vestibular joint, immediate improvement results if myringotomy be performed and a perforation be made. I had such a case in which the patient was stone-deaf bilaterally: I removed a piece from each membrane, and there was perfect hearing afterwards from the moment he came off the operating table.

Dr. P. WATSON-WILLIAMS: I did not remove the incus or the malleus in this case; I only removed the long process of the malleus, and that was done solely to secure a large persistent opening.

Mr. HUNTER TOD: Dr. Watson-Williams has had a good result in this case, but I hope it will not lead to this operation being performed without grave consideration. After removal of the handle of the malleus, if fixed by adhesions to the inner wall of the tympanic cavity, or after ossiculectomy, great improvement of hearing may be obtained, but this may be only for a short period. The ultimate result depends on whether adhesions re-form or not, and particularly whether the stapes remains movable or becomes fixed by subsequent scar tissue. Some time ago I published particulars of fifty cases of ossiculectomy performed on account of chronic middle-ear suppuration. I originally did this operation as a temporary measure in hospital cases because we had not sufficient beds to admit all those patients apparently requiring the radical mastoid operation. Some of those patients got excellent hearing; and in only three out of the fifty cases published was it ultimately necessary to perform the mastoid operation. In the cases which did well I think it was simply due to the fact that the stapes did not become fixed. I do not consider that it makes much difference with regard to the hearing power whether you only remove a piece of malleus or the malleus and incus: but by the latter method you are less likely to get recurrence of adhesions. In some of the non-suppurative cases in which ossiculectomy was performed in the hope of improving the hearing, the ultimate result showed further loss of hearing power. With regard to the excellence of hearing which may be obtained even after removal of all the ossicles, I showed a hospital case here some years ago in which, as a result of ossiculectomy, the stapes came away unexpectedly, and in spite of this the patient heard a whisper at a distance of 20 ft.[1] I saw this patient again recently, and she could still hear 10 ft. off. This shows that we do not yet fully understand the function of the ossicles with regard to hearing.

Dr. KELSON: This is a brilliant but also a dangerous result. Some time ago I did a similar operation on a couple of cases of marked chronic catarrhal deafness, in which the patients were very anxious that something should be done. But, after the usual temporary improvement, both became ill, in fact worse than before, and this is the usual experience. Cases of the kind are simply legion, and it would be disastrous if everybody were to start doing this operation. Here is an ear which suppurated after operation: how can anyone say that adhesions will not form after the suppuration? We can only suppose that in this case adhesions have not occurred, and so the improvement has continued.

[1] *Journ. Laryng., Rhin. and Otol.*, 1907, xxii, p. 33.

The PRESIDENT: The condition of the Eustachian tube seems to be of vital importance in this case: I think that it is probably the cardinal point. Assuming the Eustachian tube to be closed, I suppose the opening in the membrane would make a difference to the hearing. But if the tube is patent and the ossicles are all mobile as they are said to be, I do not see the advantage of a hole in the membrane. I have had cases in which the handle of the malleus was firmly adherent to the promontory, and I failed by removal of the handle of the malleus to obtain any result worth recording. The undoubted improvement of the hearing in Dr. Watson-Williams's case is difficult to explain.

Dr. P. WATSON-WILLIAMS (in reply): The Eustachian tube in this patient is patent. In my mastoid cases I see no objection to a patent Eustachian tube after the operation, but when there is suppuration in the mastoid, and the upper end of the Eustachian tube is open, I curette it, to get rid of the infected granulations. In many of my cases the result is good and the ear is dry although the Eustachian tube is patent. Many of the cases of chronic dry adhesive catarrh, I believe, are due to a latent infective condition, and not infrequently to a latent sinus infection in the nose, with slight persistent infection and constant re-infection of the ear. In this case there was no suppuration. You do not so often see a catarrhal condition in the ear after nose suppuration in the latent cases of sinus infection, but there is not an outpouring of leucocytes and polynuclears, and therefore when there is less gross evidence of pus there is more likely to be a widespread infection. This patient had a discharge and was deaf for three years before I saw her, and she had some catarrh in the nose. There was no gross evidence of sinus infection: there was only a little glairy fluid, and it was only by means of exploration and getting a culture and film examination made that one learnt that the sinuses were infected. I think that the failure in some of the cases where this operation has been tried has been due to overlooking the co-existence of latent sinus infection. The reason this patient's improvement has persisted is that the sphenoidal sinuses have cleared up. I always explore these sinuses before doing the mastoid operation, because it only occupies two minutes, and one sometimes gets a surprise in the shape of a sinus infection which, if undiscovered, would have spoilt the success of the mastoid operation. In answer to Dr. Kelson, I rarely do this operation, and I have not done it in another case since this was done. I should be very sorry if it were concluded from this one case that this is the sort of result one may generally expect in chronic catarrhal deafness. But with the necessary care in selection this case demonstrates that you can get a good result.

Case of Circumscribed Labyrinthitis.

By J. F. O'Malley, F.R.C.S.

Sergeant S., aged 35, came under my care at the Royal Herbert Hospital in August, 1918, with the following history: Partially deaf since 4 years of age. Right ear discharged all his life, left ear discharged for nine years.

Admitted to hospital August 10, 1918, for severe vertigo. He was unable to stand and felt giddy when lying in bed. On the second day after admission vomiting set in and all nourishment was rejected for forty-eight hours. He had gross rotatory nystagmus to the left, but as he was too ill, I did not test his equilibration. Both ears contained a little pus. Temperature was normal.

He had a milder attack of this type one year previously, but no vomiting, and a fortnight previous to August, 1918, was admitted to another military hospital for giddiness and "head symptoms," which were first suspected of being early cerebro-spinal meningitis.

As his temperature and pulse remained normal throughout the attack, I refrained from any surgical interference. He improved steadily and was able to get up and walk in ten days. He was then anxious to know if I could cure him by an operation, but I discouraged this on account of the recent inflammatory activity in the posterior labyrinth.

He has reported at intervals since and a month ago he put the following questions, on which I should like the opinion of the members:—

(1) With his ear condition would it be safe for him to invest all his earnings in a watchmaker's business? (He is a working watchmaker, and if anything happened to him the business would be useless to support his wife and family.)

(2) Would an operation make him safe, and would I recommend it?

Present condition (left ear): Scarring of the tympanic membrane with a mass of granulation tissue in the posterior part of the attic. There is very little discharge. Hearing: He cannot distinguish whispered words close to ear. Equilibration: No unsteadiness on standing with eyes shut. Caloric test: Water at tap temperature: There was a definite response after the use of 2½ pints. Rotatory vestibular nystagmus was induced. Fistula test: This was not elicited. (As this is often masked in the presence of polypi or granulation tissue I do not attach much importance to its being negative.)

DISCUSSION.

Mr. C. E. WEST: The evidence in Mr. O'Malley's case points to the patient having an irritated labyrinth, possibly a locally inflamed labyrinth. And probably resolution of the labyrinth infection has taken place. I think it is a typical case for the radical mastoid operation without further extension of the procedure. If at the operation a fistula is found, I should be tempted to curette away the granulations in the neighbourhood, and not to operate on the labyrinth.

Mr. SYDNEY SCOTT: Is Mr. O'Malley justified in calling this a case of labyrinthitis? I do not find any evidence of labyrinthitis in his notes; on the contrary, he points out that caloric and rotation tests give normal reactions. If we may presume that these tests were applied with the head upright they would certainly indicate that the superior as well as the horizontal canal was normal, which is against labyrinthitis. Vertigo and nystagmus even in the presence of middle-ear suppuration, certainly do not necessarily indicate the presence of any inflammatory intralabyrinthine process. We meet with such symptoms even in non-suppurating cases, and can sometimes induce vertigo and nystagmus by altering the tension in the normal middle ear. Recently I described a case showing how vertigo and rotatory nystagmus and forced movements of head and limbs were caused merely by suddenly altering the tension in the middle ear.[1] Moreover, the direction of the nystagmus was dependent upon whether the tension was increased or diminished. For these reasons I would not regard Mr. O'Malley's description as one of true labyrinthitis. I should agree to limit operative treatment to the middle ear as Mr. West suggests.

The PRESIDENT: On examining the man with the tuning fork I noticed that his bone conduction was quite full, and this to some extent confirms what Mr. Scott and Mr. West have said—viz., that the labyrinth was not seriously involved. I also agree with what has been said about the radical mastoid operation: there is no need to carry the procedure further than that.

Mr. O'MALLEY (in reply): I never at any time contemplated doing more than a radical mastoid operation on the patient. But I thought it would be useful if the meeting would discuss the questions I have put down. I feel he had some inflammation in the posterior part of the labyrinth when I saw him, because there was no greater reaction in his middle ear than there is now. Vomiting persisted for forty-eight hours, and I do not see a cause for that unless the posterior labyrinth was involved in an inflammatory attack, which I called circumscribed. A radical mastoid operation was what I intend doing, but I cannot guarantee it will make him absolutely safe, though it will remove his focus of disease in the attic region.

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[1] *Journ. Laryng., Rhin. and Otol.*, 1919, xxxiv, p. 51.

Case of Labyrinthectomy.

By J. F. O'Malley, F.R.C.S.

Miss H., aged 27, came under my care at the Royal Ear Hospital, in September, 1913, complaining of severe giddiness and inability to carry on her employment as a clerk in the City. Right ear: There was total loss of the membrane and malleus. The foramen rotundum, promontory and process of incus attached to the stapes were easily discernible. There was practically no inflammatory activity or pus present. Hearing was almost extinct. Left ear: Membrane intact and hearing good.

In November, 1913, I performed a radical mastoid operation and found a fistula in the external semicircular canal. Her condition did not improve, and in January, 1914, I did a labyrinthectomy. Her improvement was slow during the healing process, which lasted about two months. She then went away for change of air for some weeks and returned to business feeling quite able to carry on. The air raids upset her eighteen months ago, but beyond this she has been quite well since. As one rarely sees a case of this type at any of the meetings, I thought it might interest members to see this patient.

DISCUSSION.

Mr. Lawson Whale: Will Mr. O'Malley explain the technique he employed, as there are so many operations performed under the name of labyrinthectomy?

Mr. O'Malley (in reply): The patient was in a very wretched condition when she came to me in the end of 1913, and was uncertain in her movements when walking in the street, and consequently she had to stay away from business. Her giddiness and spontaneous nystagmus were very manifest. After trying palliative treatment for a time, I decided on a radical mastoid operation, and then I found a fistula in the semicircular canal. I waited to see how she went on, but as she became worse I decided to open the labyrinth. I did a double vestibulotomy, and also opened the cochlea. After a couple of months her condition improved, and she has remained well since.

Mr. C. E. West: In connexion with what Mr. O'Malley said in regard to complete destruction of nerve-endings in these operations on the vestibule, it is my belief that the giddiness, after destroying operations on the labyrinth, is not due to survival of the irritable nerve-endings, but to the destruction of the nerve-endings; that the giddiness is due simply to the sudden creation of labyrinth asymmetry on the two sides, and is precisely similar, in type and effect, to that of irritation of the opposite labyrinth. And I think the type of the nystagmus conforms to that. In the treatment of these cases I used to mop out the vestibule with formalin, but I have given that up now: I think one is safer without it, especially in regard to the facial nerve. I have paralysed one facial nerve with formalin. Patients do better by simple opening and drainage of the vestibular cavity by double operation or the inferior operation alone, which suffices in most cases. Why, too, did Mr. O'Malley go forward in the cochlea, because risks of translation of infection through the internal auditory meatus are greatly increased if the cochlea is opened?

Mr. Sydney Scott: Was the operation performed on an active or defunct labyrinth, as there is no mention of this? Was the patient giddier during the first three or four days following the vestibulotomy, or was there no giddiness? The former would of course indicate that the labyrinth was active, while the latter would show that it was already defunct.

Mr. J. F. O'Malley (in further reply): The labyrinth was very active, and responded to all the ordinary tests, so before I tried to ablate it that labyrinth was active. I did not enter into detail on the points about which Mr. West asked me, because I am familiar with the fact that when a labyrinth is suddenly destroyed by gross disease or by operation, you get a definite set of symptoms, which depend on the over-action of the opposite labyrinth. Such symptoms were present in my case. But the long time she took to recover her balance led me to conclude that perhaps I had not fully got rid of all the nerve tissue. She had noises on that side, but no hearing. The cochlea was opened to get rid of the noises.

Two Cases of Fracture of the Base followed by Otitis Media, Meningitis and Death.

By J. S. Fraser, M.B.

(From the Ear and Throat Department, Royal Infirmary, Edinburgh, under the charge of A. Logan Turner, M.D., F.R.C.S.E., F.R.S.E.)

On November 17, 1916, I demonstrated before this Section two cases of fracture of the base of the skull involving the ear. Both of these patients died very soon after the injury, from compression of the brain. In the first case fracture of the base was accompanied by bleeding from the ear but there was no flow of cerebro-spinal fluid and microscopic examination showed that the fracture involved only the middle ear while the labyrinth capsule was not injured. In the second case there was a flow of blood mixed with cerebro-spinal fluid from the external meatus, and here microscopic examination of the ear demonstrated that the fracture involved the labyrinth capsule and reached the internal auditory meatus.

I now bring before you two further cases (Nos. III and IV) of fracture of the base associated with injury to the ear. In the first of these the line of fracture passed through the internal meatus and vestibule and the injury was followed by infection of the effused blood with suppuration in the middle and inner ear, followed by meningitis. The injury occurred on February 11, 1917, and death took place on February 15. In the second case demonstrated to-day the patient—a child aged 6—suffered from fracture of the base of the skull in August, 1913, but at the time made a good recovery from this injury. *One year later* the patient suffered from double suppurative otitis media and the infection appears to have passed through the tympanic cavity and to have given rise to purulent meningitis, from which patient died. The labyrinth was not involved and it is reasonable to suppose that the infection occurred through the preformed path made one year before when the skull was fractured and, as post-mortem examination of the ear showed, the incus was dislocated into the mastoid antrum and the roof of this cavity fractured.

CASE III.—FRACTURE OF BASE INVOLVING RIGHT MIDDLE AND INNER EAR: PURULENT OTITIS MEDIA AND INTERNA WITH PURULENT LEPTOMENINGITIS. (*See* figs. 1, 2, 3, and 4.)

J. L., male, aged 44, labourer, was admitted on February 13, 1917. Two days before admission, as he was going home under the influence of alcohol, he slipped and fell on the pavement, striking the right side of his head. He was not unconscious after the accident but there was bleeding from the right ear and also from the mouth. The hæmorrhage, however, soon stopped. After the accident the patient suffered from severe vertical headache and was not able to sleep. On admission he felt as if he were rotating from left to right about a vertical axis. The right ear has been quite deaf since the accident. He has felt sick but has not vomited.

Examination.—Slight watery discharge from right ear. Right tympanic membrane red and bulging but perforation not seen. *Cochlear apparatus:* Complete deafness in the right ear with the noise box in the left. Weber lateralized to good ear. *Vestibular apparatus:* Spontaneous nystagmus to left (sound side) of second degree. Patient tends to fall to the right and shows a pointing error to the right. Anterior rhinoscopy normal. No blood seen at Eustachian orifice on posterior rhinoscopy. Patient lies in bed on his left (sound) side. No facial paralysis. On admission (February 13, 1917): Temperature, 101° F.; pulse, 76; at 4 p.m. the temperature rose to 103° F. Sterile cotton wool placed in external meatus; purgative given. Kernig's sign absent; plantar flexion on Babinski's test; knee-jerks normal; superficial reflexes present. Fundus normal. Lumbar puncture: Fluid blood-stained but not under pressure. (Films showed marked increase in cells, with many polymorphs. Red blood corpuscles present in large numbers. No organisms seen in films and on culture only one or two colonies of staphylococcus developed—contamination ?) Temperature, 102° F., and pulse 80, at 8 p.m. February 15, 1917: Patient very ill. Severe headache and backache. Temperature 105° to 104° F., pulse only 72. Kernig's sign present. Knee-jerks increased. Slight facial paralysis on right side. Second lumbar puncture: Fluid under great tension and still blood stained. Polymorphs greatly increased. Cultures again show a Gram-positive staphylococcus (*albus*). Patient died at 12.45 p.m.

Post-mortem.—Blood present over the vertex in subdural space and also in the right temporal region. At the base of the brain purulent leptomeningitis was present over pons, medulla and lower surface of cerebellum. Laceration of left temporo-sphenoidal lobe. The right temporal bone showed a stellate fracture involving both petrous and squamous portions. In the roof of the antrum a piece of bone was loose. The fracture passed through to the roof of the external meatus.

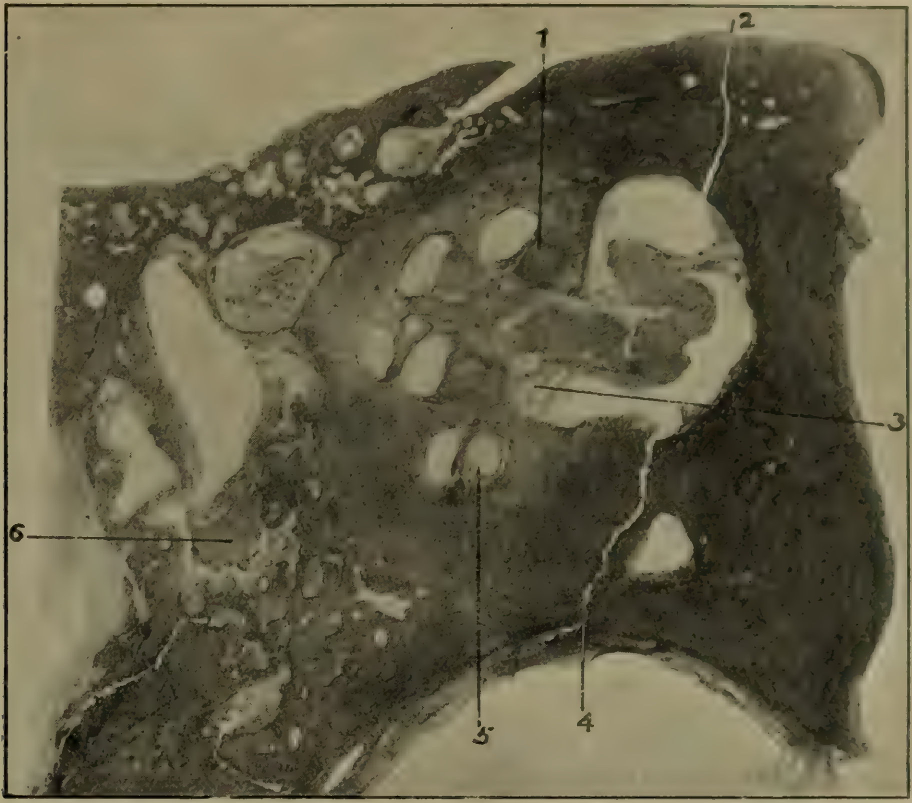


FIG. 1 (Case III).

J. L., aged 44. Recent fracture of base involving right middle and inner ear, followed by purulent labyrinthitis and meningitis. Vertical section No. 125, × 6 diam. 1, scala tympani of upper part of basal coil, filled with hæmorrhagic exudate; 2, upper end of fracture; 3, the cochlear nerve surrounded by meningitis; 4, lower end of fracture; 5, basal coil filled with exudate; 6, exudate in tubal portion of tympanic cavity.

Microscopic Examination of Right Middle and Inner Ear.
(*Vertical Sections from before backward.*)

External Auditory Meatus.—The external meatus contains desquamated epithelium and there is blood on the floor. Hæmorrhage has stripped off the epithelium at the inner end of the external meatus in the posterior superior part, where the fracture appears. The anterior wall of the external auditory meatus is also fractured.

Tympanic Membrane.—The tympanic membrane is thickened. The mucous lining of the drumhead in the upper part is partially stripped off. In the lower part of the drumhead the superficial epithelium is separated into two layers and between them there is blood. Further in, between the mucosa and fibrous tissue layer, there is blood-clot and fibrin formation. There is a rupture of the tympanic membrane below and behind the handle of the malleus.

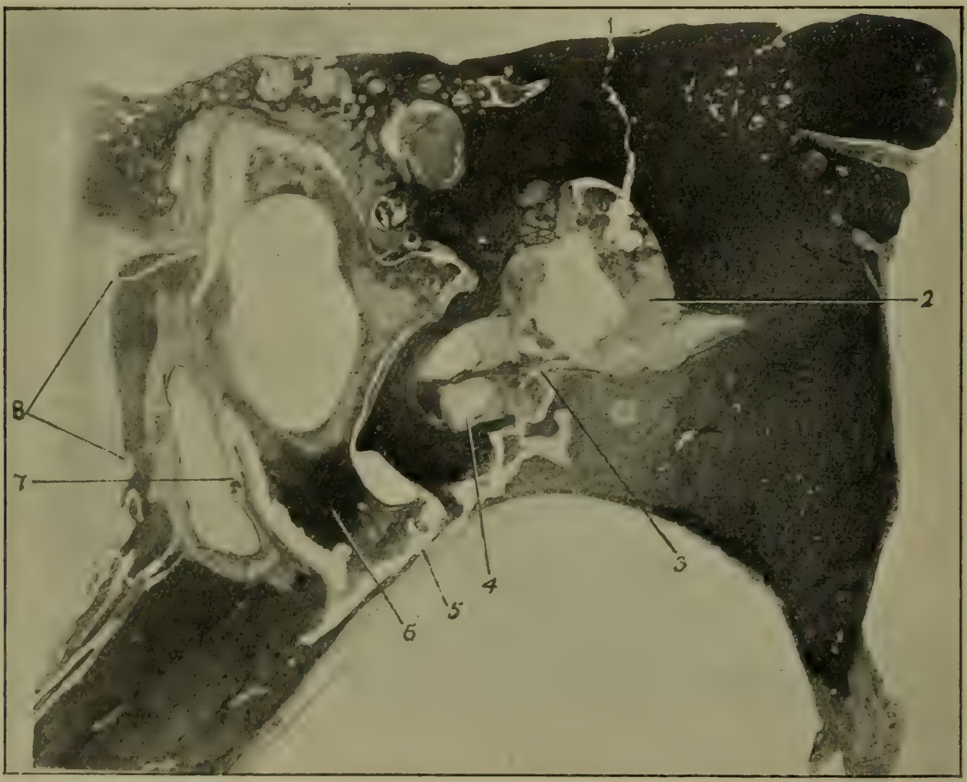


Fig. 2 (Case III).

Vertical section No 260, × 6 diam. 1, upper end of fracture, which passes into vestibule; 2, hæmorrhagic purulent exudate in vestibule; 3, fracture through bony spiral lamina; 4, exudate in scala tympani; 5, lower end of fracture; 6, hæmorrhagic exudate in tympanic cavity; 7, perforation of tympanic membrane; 8, fracture of external meatus.

Eustachian Tube.—The outer wall of the tube is fractured. The mucous membrane is practically healthy. The exudate in the tube contains many pus cells but in the lower part of the tube it is mainly blood.

Tympanic Cavity.—There is a fracture through the roof of the tympanic cavity which runs into the processus cochleariformis. In the roof of the tympanum there is an air-cell containing hæmorrhage.

Just above the head of the malleus the roof is very thin and is shattered. The fracture extends through the roof to the aditus and antrum and then through the outer wall of the attic into the external meatus. There is blood in the cells above and internal to the labyrinth and also in the cells in the floor of the tympanic cavity in the anterior part. There is also a fracture of the floor of the tympanum—i.e., of the roof of the jugular bulb. The clot in the tympanic cavity has shrunk against the walls leaving a clear space in the middle. The tympanic mucosa is slightly thickened and infiltrated. There is hæmorrhage in the outer part of the attic and also in the fold of mucous membrane joining the malleus to the attic wall. There is blood and pus in the sinus tympani. In the lower part of the tympanum posteriorly the exudate is purulent.

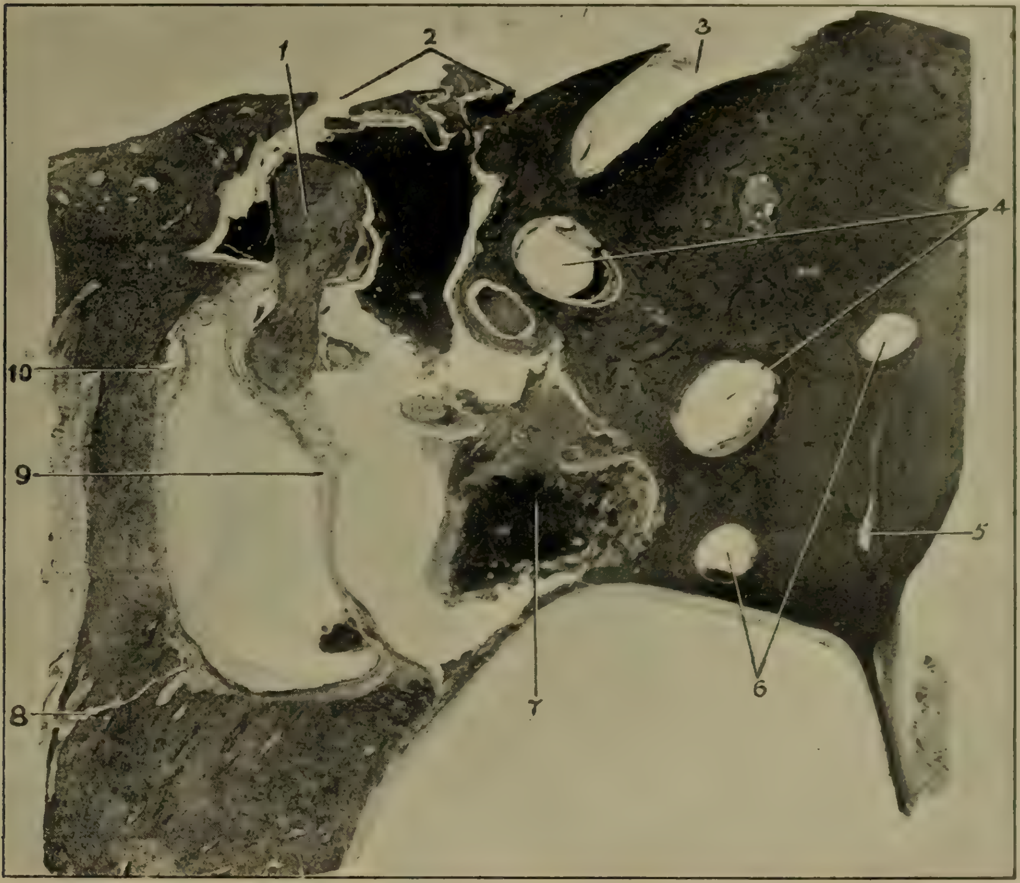


FIG. 3 (Case III).

Vertical section No. 364, × 6 diam. 1, head of malleus; 2, fracture of tympanic roof; 3, superior vertical canal; 4, two ends of lateral canal; 5, ductus endolymphaticus; 6, two ends of posterior vertical canal; 7, exudate in tympanic cavity; 8 and 10, fracture of external meatus; 9, perforation of tympanic membrane.

Ossicles and Muscles.—The stapes has been crushed and shows at least two fractures. There is pus in the joint between the incus and stapes. The malleus and incus are not fractured. The tensor tympani and stapedius are healthy.

Facial Nerve.—The facial nerve is healthy as it passes above the cochlea, but the fracture goes through the facial canal above the oval window. There is very little hæmorrhage in the facial canal itself.

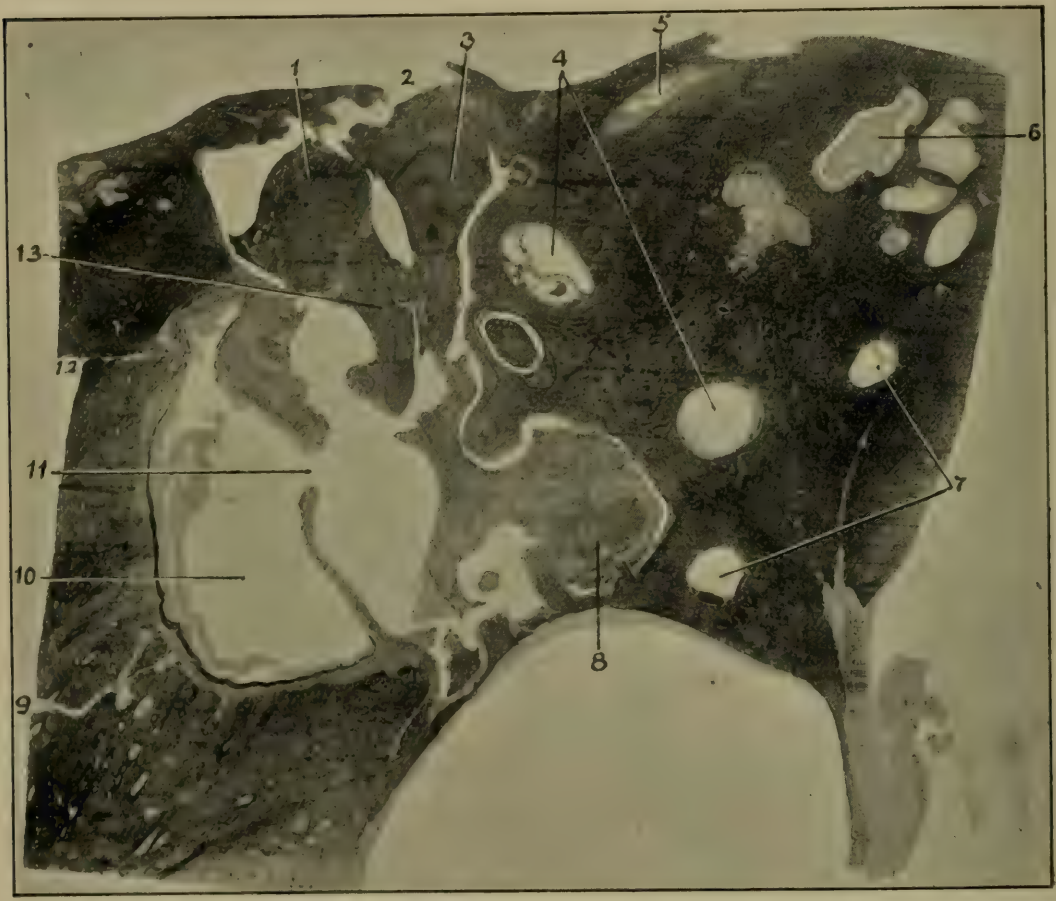


Fig. 4 (Case III).

Vertical section No. 385, × 6 diam. 1, head of malleus; 2, upper end of fracture; 3, exudate in aditus; 4, two ends of lateral canal; 5, superior canal; 6, exudate in air cell internal to labyrinth; 7, two ends of posterior canal: 8, exudate in sinus tympani; 9 and 12, fracture of anterior wall of external meatus; 10, external meatus; 11, perforation of drumhead; 13, long process of incus.

Labyrinth Windows.—There is some infiltration but no rupture of the annular ligament. The fracture passes through the upper margin of the oval window. There is also a fracture of the region of the round window. One can trace the continuity of the exudate in the niche of the round window with that in the scala tympani.

Cochlea.—Except at the beginning of the basal coil (intra-vestibular portion of cochlea) the bony capsule of the cochlea is not involved in the fracture. There is hæmorrhage in the spiral ligament, especially in the basal coil. Corti's organ is unrecognizable—just an amorphous mass with cells lying in the basilar membrane. There is some organization of the exudate in the scala media and in the upper part of the basal coil in the scala vestibuli. The helicotrema shows hæmorrhage and it is doubtless through this that the blood in the scala tympani has got into the scala vestibuli. All three scalæ contain exudate but the scala tympani shows much more than the others. In the blood in the scala tympani in the basal coil there is a peculiar concentric arrangement as if the blood had been poured out in layers. In the apical coil of the cochlea Reissner's membrane is ruptured. In the lower part of the middle coil Reissner's membrane lies almost in contact with the basilar membrane. There is very little, if any, blood in the aqueduct of the cochlea, though the fracture runs right through this region.

Vestibule.—The fracture runs into the roof of the vestibule and then downwards through the bony spiral lamina and the region of the round window into the tympanic cavity and finally passes through the floor of the cavity. The aqueduct of the vestibule contains hæmorrhage at the vestibular end but further inwards the aqueduct is almost free from blood. The vestibule itself is almost completely filled with hæmorrhage. Only traces are seen of the membranous structures in the vestibule; for the most part they have disappeared. Inside the vestibule the clot has shrunk against the walls, leaving a clear space. Apparently the infection has not passed to the meninges along the aqueduct of the vestibule. The tip of the promontory is almost chipped off.

Canals.—There is no fracture of the labyrinth capsule in the region of the canals. The lateral canal contains pus and blood. The superior canal contains very little hæmorrhage. The crista of the superior canal is fairly normal but the cupola is not present. The endolymphatic space of the posterior canal is filled with cells. The non-ampullated end of the posterior canal is almost healthy. The crus commune is almost free from blood.

Internal Meatus.—There is very little blood in the internal auditory meatus though the fracture extends right through from the floor of the middle fossa, through the bony roof and floor of the meatus, to the region of the opening of the aqueduct of the cochlea. There appears to be a rupture of the dura in the roof of the internal meatus and there is some hæmorrhage between the dura and the bone. The fracture extends down to the glosso-pharyngeal nerve. Some cellular exudate is present in the fundus of the internal meatus, but there is apparently no tear of the nerves.

Jugular Bulb.—The fracture extends through to the roof of the jugular bulb, though the bulb itself is healthy.

CASE IV.—FRACTURE OF THE BASE WITH FRACTURE DISLOCATION OF INCUS AND RUPTURE OF ROOF OF RIGHT MASTOID ANTRUM, AUGUST, 1913. ONE YEAR LATER DOUBLE ACUTE PURULENT OTITIS MEDIA FOLLOWED BY LEPTOMENINGITIS AND DEATH.

J. F., male, aged 6, admitted on August 31, 1914. The child suffered from fracture of base of skull in August, 1913, with bleeding from right ear. At this time he was admitted to the Royal Infirmary for fifteen days. He remained well till August 30, 1914, when earache (right ear) and headache came on. August 31, 1914: Vomiting. Unconsciousness at 10 p.m., jerkings of right arm. Right pupil larger than left. Rigidity of neck. Kernig's sign doubtful. Admitted to Ear and Throat Department at midnight. August 31, 1914: Right meatus contained wax. Temperature 101° F., pulse 110, respirations 24. General twitchings of right side with rolling of eyes. Death at 7 a.m., September 1, 1914.

Post-mortem (five and a half hours after death).—Flattening of convolutions. Cerebro-spinal fluid increased and turbid: exudate in interpeduncular space. No obvious tubercles. Films from exudate show mononuclear cells and some polymorphs. No organisms seen. No tubercle bacilli. Cultures sterile after twenty-four hours. Sphenoid and ethmoid healthy. Left middle ear contained turbid fluid. Old fracture of roof of right mastoid antrum.

Microscopic Examination of Right Ear. (*Vertical Sections from before backward.*) (*See* figs. 5, 6, 7, and 8.)

External Auditory Meatus and Mastoid.—The mastoid process is cellular, the cells extending right up to the middle and posterior fossæ. Many of these cells are full of pus. There is a gap in the roof of the mastoid antrum. The gap is filled with fibrous tissue, and there is a piece of bone lying loose in the midst of this fibrous tissue, with pus around it. This piece of bone proves to be the incus, which has become dislocated backwards into the mastoid antrum. From the appearance of the well formed fibrous tissue surrounding the incus it is evident that this is an old dislocation. What appears to have happened is that the incus became dislocated backwards at the time of the fracture in 1913, retaining its attachment to the floor of the aditus, and at the same time there was a fracture of the roof the antrum. The patient recovered at the time as no infection occurred, but one year later when he developed an acute suppurative otitis media the infection passed by way of the tympanic cavity, the aditus and antrum, through the old gap, which was apparently filled with fibrous tissue, to the intracranial structures, and the result was purulent leptomeningitis and death.

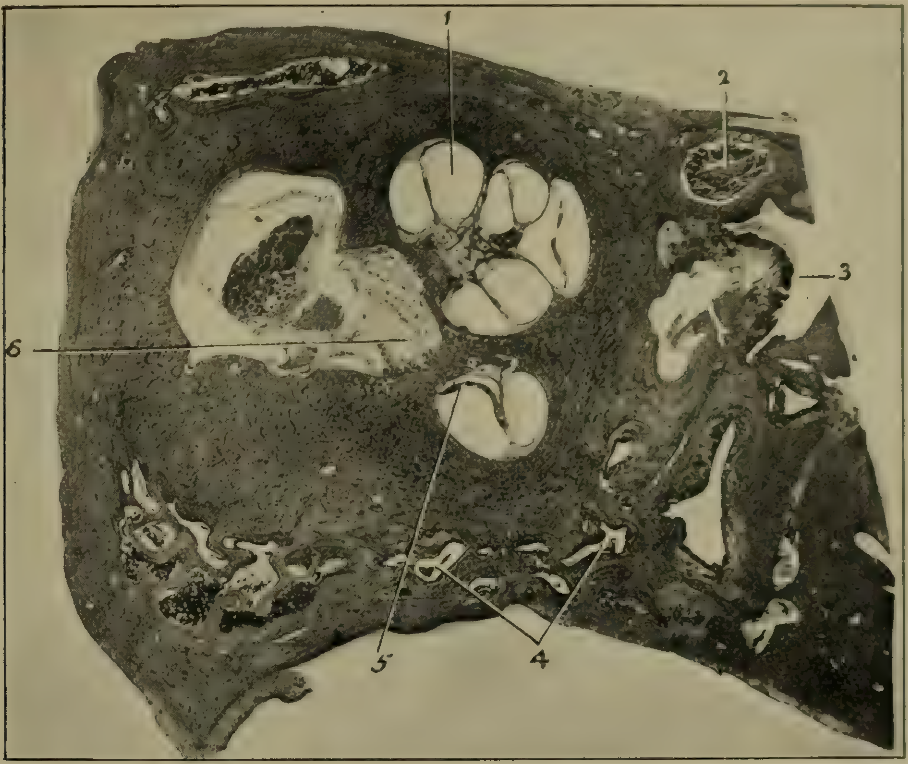


FIG. 5 (Case IV).

J. F., aged 6, old fracture of base one year before onset of acute suppurative otitis media (bilateral). The infection appears to have spread to the meninges through the gap left by the old fracture in the roof of the antrum. Vertical section through right middle and inner ear, No. 190, × 6 diam. 1, upper part of basal coil of cochlea normal; 2, tensor tympani; 3, tubal portion of tympanic cavity showing swollen infiltrated mucosa; 4, purulent exudate in air cells below cochlea; 5, purulent exudate passing into scala tympani of basal coil from the internal meatus; 6, fundus of internal meatus with branches of cochlear nerve surrounded by meningitis.

Tympanic Membrane.—The mucous membrane layer is very thick. There is no sign of rupture of the drumhead.

Eustachian Tube.—The lining membrane of the tube itself is very vascular and swollen, and the submucosa is infiltrated with pus cells.

Tympanic Cavity.—The tympanic cavity is full of pus. There is no sign of fracture of the roof of the cavity. There is pus in the cells in the roof of the tympanic cavity, but there is no sign of erosion of the lateral canal.

Ossicles and Muscles.—The footplate of the stapes is quite normal. The crura of the stapes are present and attached to the stapes. It is the long process of the incus which has been broken. The head of the malleus is in very close contact with the roof of the tympanic cavity, there is some fibrous tissue and blood clot external to it. The head of the malleus appears to be ankylosed to the new bone which

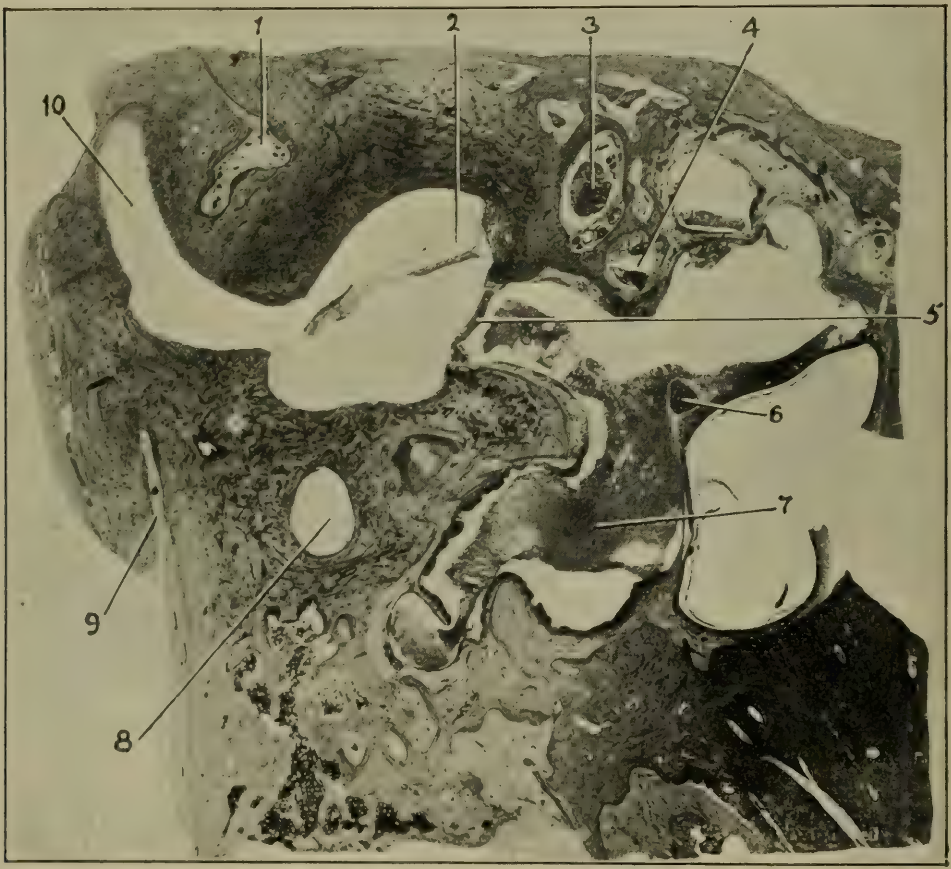


Fig. 6 (Case IV).

Vertical section, No. 390, × 6 diam. 1, fossa subarcuata with engorged vessels; 2, utricle; 3, facial nerve; 4, tensor tympani; 5, footplate of stapes; 6, handle of malleus attached to drumhead; 7, purulent exudate in tympanum; 8, ampullary end of posterior canal; 9, saccus endolymphaticus; 10, smooth end of superior vertical canal.

has been formed in the roof of the middle ear. The tensor tympani is healthy.

Labyrinth Windows.—The mucosa in the oval window is not much thickened. The niche of the round window contains pus and swollen mucosa, but there is no evidence of infection passing through the round window membrane.

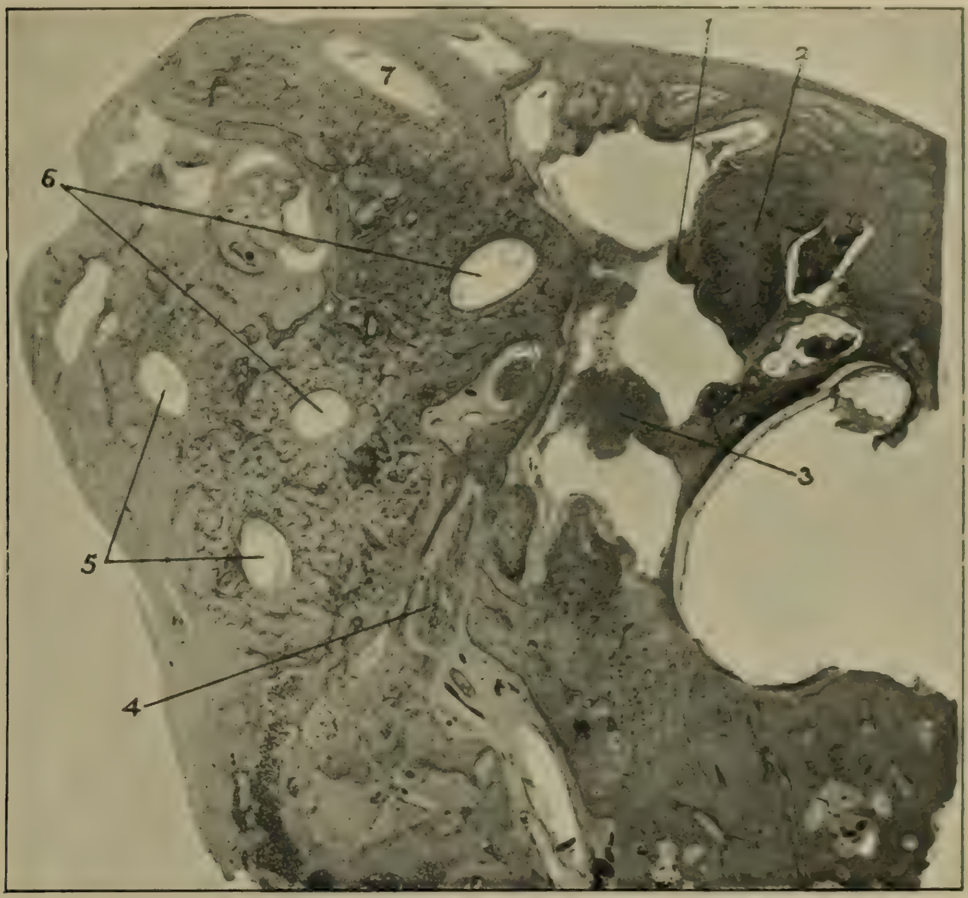


Fig. 7 (Case IV).

Vertical section, No. 510, × 6 diam. 1, position which should be occupied by incus (compare fig. 4, No. 13); 2, head of malleus; 3, exudate in tympanum; 4, stapedius muscle; 5, two ends of posterior canal; 6, two ends of lateral canal; 7, superior canal.

Cochlea.—There are many white cells in the scala tympani in the basal coil. There is a layer of pus cells in the scala tympani just on the inner aspect next to the modiolus. There is also a layer of pus cells in the middle coil in the scala tympani. The pus in the scala tympani does not extend as far as the helicotrema. It may have been that the infection from the meninges spread up to the scala tympani along the cochlear aqueduct even though the aqueduct itself is not crowded with pus. There is some infiltration of pus cells from the internal meatus into the spiral ganglion of the basal coil. Corti's organ is quite normal. There is no sign of any recent fracture in the cochlear part of the specimen. Reissner's membrane is slightly depressed in all coils, as is usual in cases of meningitis.

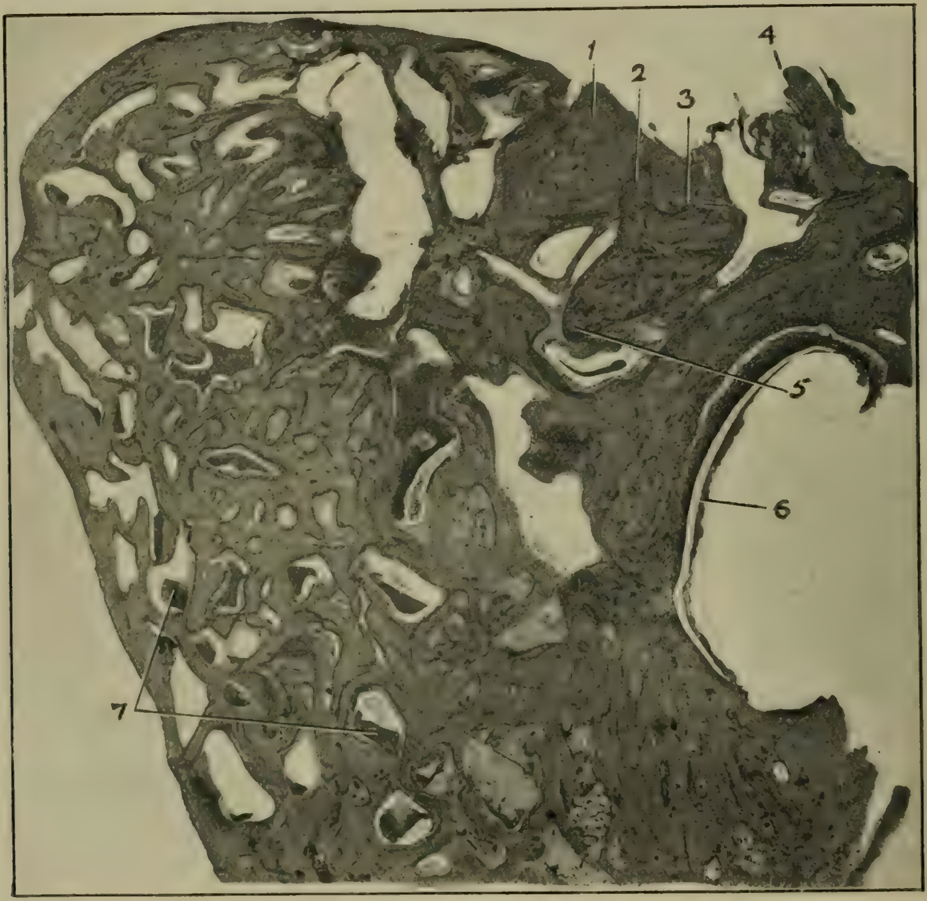


Fig. 8 (Case IV).

Vertical section, No. 635, × 6 diam. 1, connective tissue in gap left by old fracture; 2, long process of incus; 3, articular surface of incus; 4, outer edge of old fracture; 5, tip of short process of incus which has remained attached to floor of aditus while the rest of the bone became dislocated upwards and backwards into the antrum; 6, epidermic lining of external meatus peeling off; 7, exudate in air cells behind labyrinth.

Vestibule and Canals.—The utricle and saccule are quite healthy, also the corresponding nerves. There is pus in the narrow canal containing the nerve to the ampulla of the posterior canal, but the ampulla itself is healthy.

Internal Meatus.—There are many white cells in the internal meatus within the arachnoid sheath—i.e., there is definite meningitis in the internal meatus.

The facial canal, the saccus endolymphaticus, and the jugular bulb are all normal:

Otosclerosis associated with Otitis Media.

By J. S. FRASER, M.B.

[*Note.*— On two previous occasions (May 19, 1916, and November 17, 1916), similar cases of otosclerosis associated with otitis media have been demonstrated before this Section.—J. S. F.]

OLD MIDDLE-EAR SUPPURATION (BILATERAL). ON RIGHT SIDE, CHRONIC ADHESIVE PROCESS WITH OBLITERATION OF TYMPANIC CAVITY AND OTOSCLEROSIS. ON LEFT SIDE, CHRONIC SUPPURATION WITH CHOLESTEATOMA, FISTULA IN LATERAL CANAL, LABYRINTHITIS, CEREBELLAR ABSCESS AND MENINGITIS. OTOSCLEROSIS ALSO PRESENT ON THE LEFT SIDE IN USUAL SITUATION.

W. F., MALE, aged 27, admitted December 1, 1915. Patient has had chronic middle-ear suppuration on the left side for ten years. Some years ago an incision was made behind the left ear, and since then there has been discharge at times from the wound. Ten days before admission the wound ceased to discharge, and three days later the patient began to have occipital and frontal headache. Four days before admission vomiting commenced and has continued. For one week there has been facial paralysis on the left side. Of late the patient has complained of giddiness on getting out of bed, and has tended to fall to the left side.

Examination.—The right drumhead shows a large retracted scar. The left external meatus contains fœtid pus and granulations. *Cochlear apparatus*: Schwabach lengthened; Weber lateralized to right (better) ear; Rinne absolutely negative on left side. On the right side Rinne is *said to be positive!* (This test was *not* carried out by Dr. Turner or the writer.) Patient cannot hear any of the tuning-forks by air conduction on the left side. With the noise apparatus in the right ear patient is quite deaf. *Vestibular apparatus :* On Romberg's test patient falls to the left, and the direction of the fall is not altered by changing the position of the head. Slight spontaneous nystagmus to the right and slow coarse rotatory nystagmus to the left; slight nystagmus on looking straight forward; pointing error to right with both upper extremities. Cold syringing of left ear produced no change in the spontaneous nystagmus in one and a half minutes. *General condition:* Temperature 98·4° F., pulse 88, respirations 20. Patient lies curled up in bed on the left side (diseased side). Complete facial paralysis on left side. Pupils equal and react to light. No ocular paralysis and no double vision. Patient is bright mentally, and answers questions well, though he has had a stammer since childhood. Knee-jerks present and equal. No ankle clonus. Flexor response to Babinski's test. No Kernig's sign. "Finger nose" test more accurately performed on right

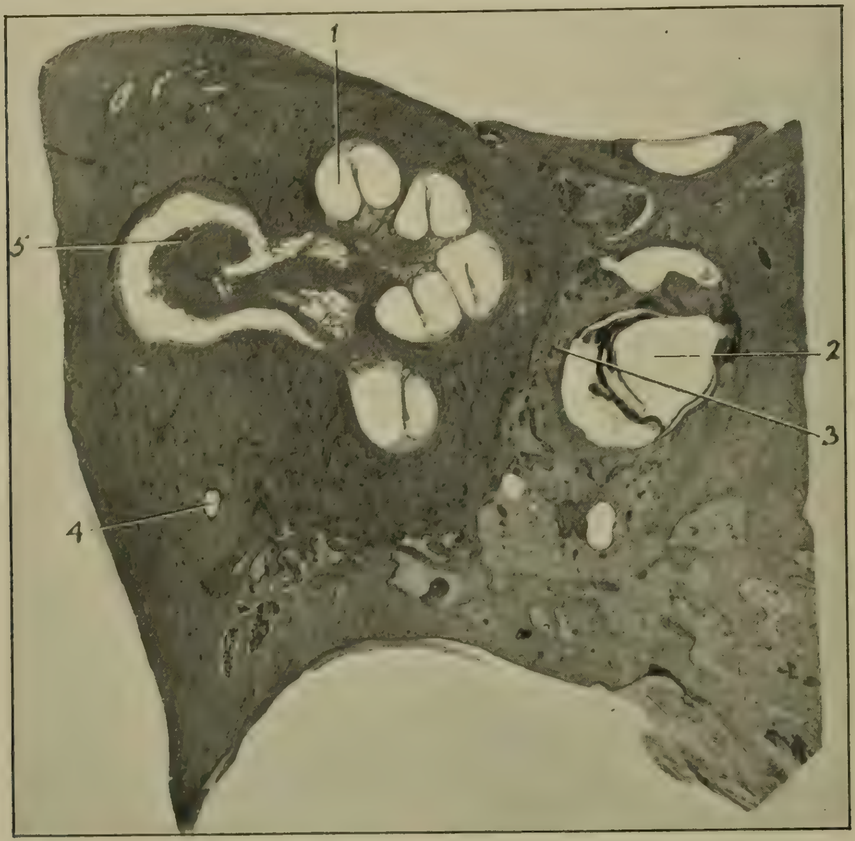


FIG. 9.

W. F., aged 27; old bilateral middle-ear suppuration associated with otosclerosis. Vertical section through right ear, No. 115, × 6 diam. 1, upper part of basal coil of cochlea; 2, Eustachian tube which communicates directly with the external meatus; 3, tympanic cavity obliterated by connective tissue; 4, aqueduct of cochlea; 5, internal meatus showing meningitis within arachnoid sheath.

side than on left side. Dysdiadokokinesia well marked on left side. Grasp of both hands good. Tongue rather furred.

Operation on Evening of Admission.—Cicatrix on surface of left mastoid. Mastoid process sclerotic with a track of pus extending from the surface to the antrum, which was full of cholesteatoma. Fistula from antrum through posterior wall of meatus. Dense healthy bone over sinus, and sinus wall normal. Fistula present in lateral canal. Facial nerve lying uncovered by bone above oval window. Roof of tympanum and antrum healthy. Dense healthy bone present in triangular area and healthy dura mater exposed in this region. Posterior canal opened up (Neumann's operation); promontory also removed. Dura of triangular area slit up. No excess of cerebro-spinal fluid. No pus in subdural or subarachnoid space. Cerebellum explored with negative result.

Progress.—December 2, 1915: Temperature 99° F., pulse 64 to 76. Vomiting present. December 3, 1915: Temperature 96·2° F., pulse 60. Patient became very restless this morning and had to get heroin. Kernig's sign present with meningitic cry. *Lumbar puncture:* Cerebrospinal fluid alkaline. Albumin in excess. "Fehling reducing substance" present. Microscopic examination shows many polymorphs but no bacteria. Cultures negative. Wound dressed. Cerebellum again explored with negative result. Later in the day patient became unconscious. December 4, 1915: Death at 1 a.m.

Post-mortem.—Basal meningitis. Outer aspect of left lobe of cerebellum lacerated opposite surgical opening in skull. On transverse section of the cerebellum an abscess, the size of a walnut, is seen in the anterior part of the left lobe further forward than the exploratory opening (although this had been made in front of the sigmoid sinus). The abscess contains greenish-yellow pus and its walls are sloughy. The abscess abuts closely on the fourth ventricle, but no communication is visible. The ventricles of the brain contain slightly turbid fluid.

Microscopical Examination of Right Ear (Chronic Adhesive Process and Otosclerosis). (Vertical Sections from before backward.) (See figs. 9—14.)

Tympanic Membrane.—There is a large retracted scar in the drumhead adherent to the promontory. The scar is adherent to the long process of the incus, and Shrapnell's membrane is greatly retracted and adherent to the neck and head of the malleus, so that Prussac's space is obliterated.

Eustachian Tube.—There is a slight layer of mucus over the epithelium of the tube. The epithelium on the floor of the tube is squamous and is peeling off.

Tympanic Cavity.—The upper part shows very swollen mucosa, practically no tympanic cavity remains. There is also great thickening of the mucosa in the lower part. The attic is filled with delicate connective tissue. The lateral canal prominence is normal on the inner wall of the aditus—no osteitis vasculosa here. The aditus is obliterated by new connective tissue. The antrum is not entirely obliterated as there is a small space just above the prominence of the lateral canal.

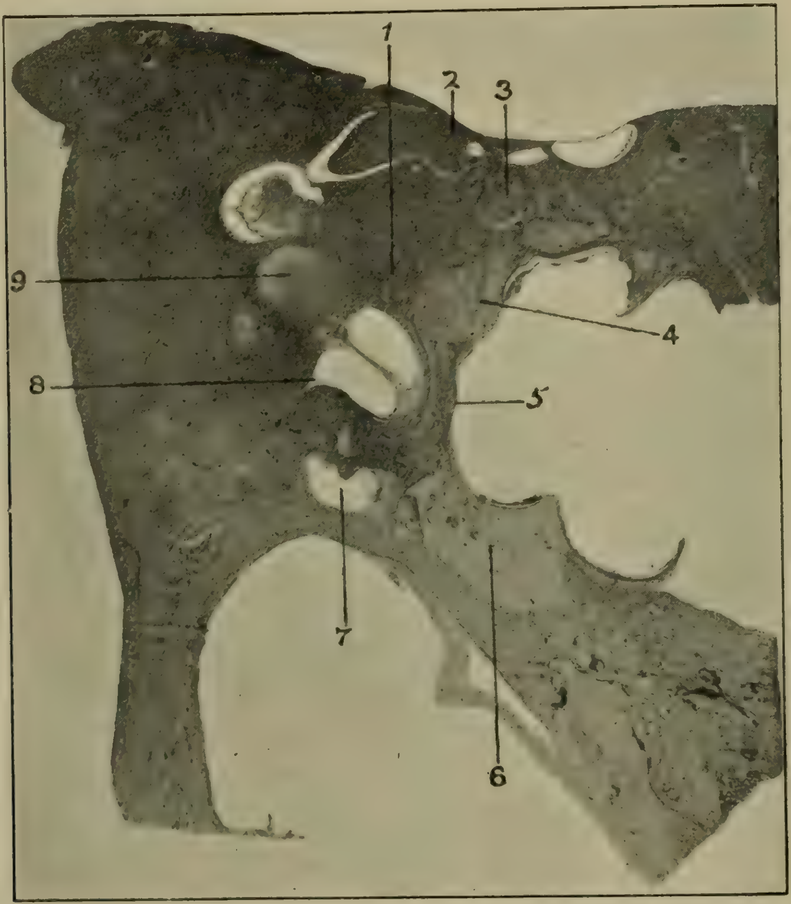


FIG. 10.

W. F. Section through right ear, No. 220, × 6 diam. 1, area of otosclerosis; 2, geniculate ganglion of facial nerve; 3, tensor tympani; 4, tympanic cavity obliterated; 5, promontory covered by squamous epithelium; 6, hypotympanic cavity obliterated by connective tissue; 7, niche of round window; 8, cochlear opening of perilymphatic aqueduct; 9, anterior wall of sacculus.

Ossicles and Muscles.—The stapes is present, embedded in granulation tissue. The long process of the incus is embedded in the thick granulation tissue of the oval window. The head of the malleus and body of the incus are normal. The periosteum of the short process of the incus is greatly thickened. The stapes is not ankylosed. The tensor tympani is healthy. The stapedius is normal.

Facial Nerve.—There is squamous epithelium on both sides of the geniculate ganglion.

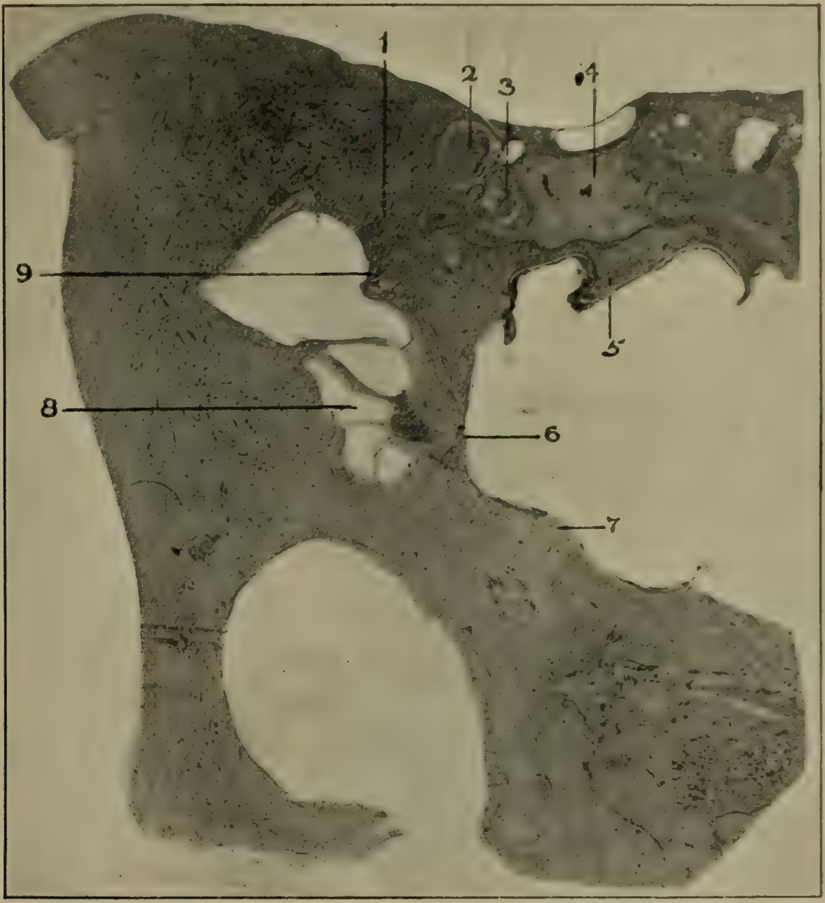


FIG. 11.

W. F. Vertical section of right ear, No. 255, × 6 diam. 1, upper margin of otosclerotic area : 2, facial nerve ; 3, tensor tympani ; 4, attic obliterated by connective tissue ; 5 and 7, upper and lower margins of annulus tympanicus, between which the tympanic membrane should stretch ; 6, scar in drumhead adherent to promontory ; 8, niche of round window ; 9, footplate of stapes not ankylosed.

Oval Window.—An area of otosclerosis (osteitis vasculosa) is seen just above the basal coil of the cochlea in the anterior margin of the oval window. Some giant cells are present in the large vascular spaces of the new bone formation. The mucous membrane of the niche of the oval window is very thick, infiltrated and vascular, and there are cystic spaces in the submucosa. There is no area of osteitis vasculosa in the posterior margin of the oval window.

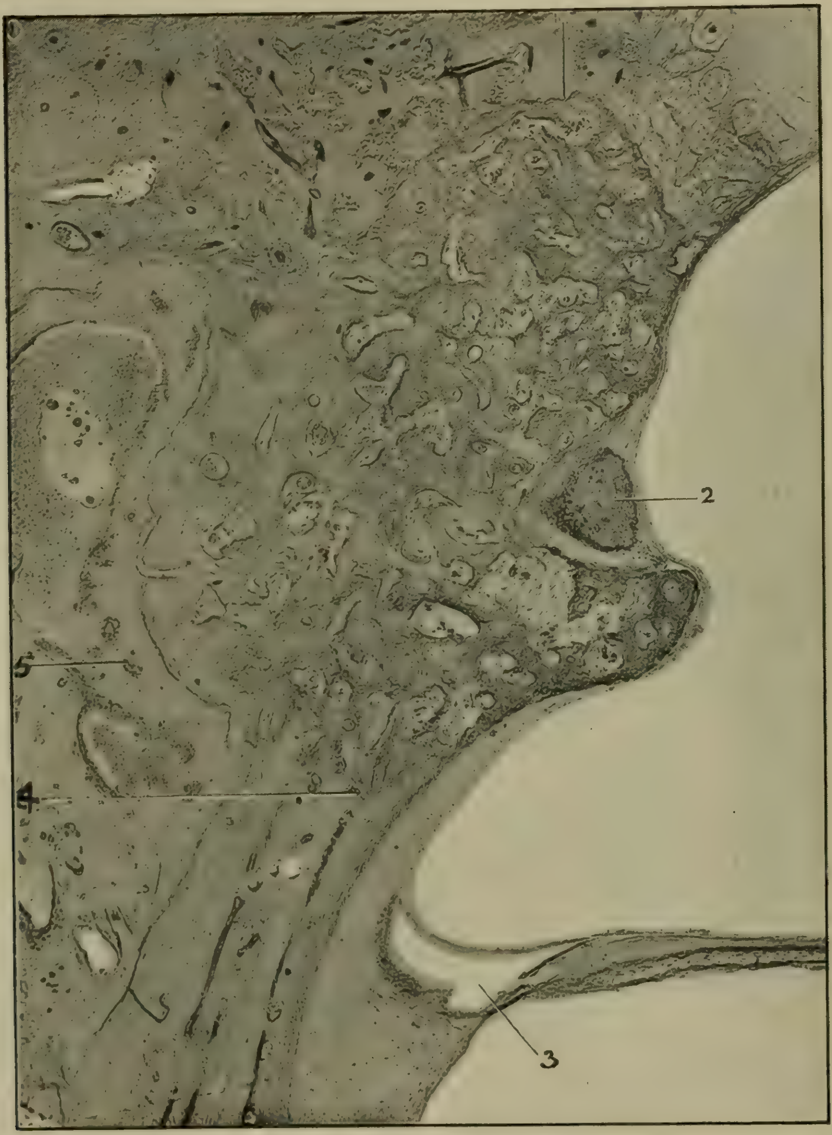


Fig. 12.

W. F. Vertical section of right ear, No. 255, × 35 diam. Higher power view of part of fig. 11. 1, upper edge of otosclerotic area ; 2, footplate of stapes not ankylosed ; 3, intravestibular portion of scala media ; 4, lower margin of otosclerotic area ; 5, connective tissue filling niche of oval window.

Round Window.—The mucous membrane of the niche of the round window is a little swollen, and there is blood pigment present here.

Cochlea.—The basal coil is healthy. There is a little pus in the cranial end of the perilymph aqueduct, and some pus cells in the aqueduct of the cochlea. Corti's organ is healthy, the hair cells are visible in the middle and apical coils. There is some blood pigment in the modiolus. There are practically no pus cells in the cochlear opening of the aqueduct of the cochlea.

Vestibule.—The otosclerosis reaches the endosteum of the vestibule just above the intravestibular part of the cochlea, and new vascular bone bulges into the vestibule (endostosis). The utricle and saccule are collapsed owing to the presence of an air bell in the vestibule (artefact).

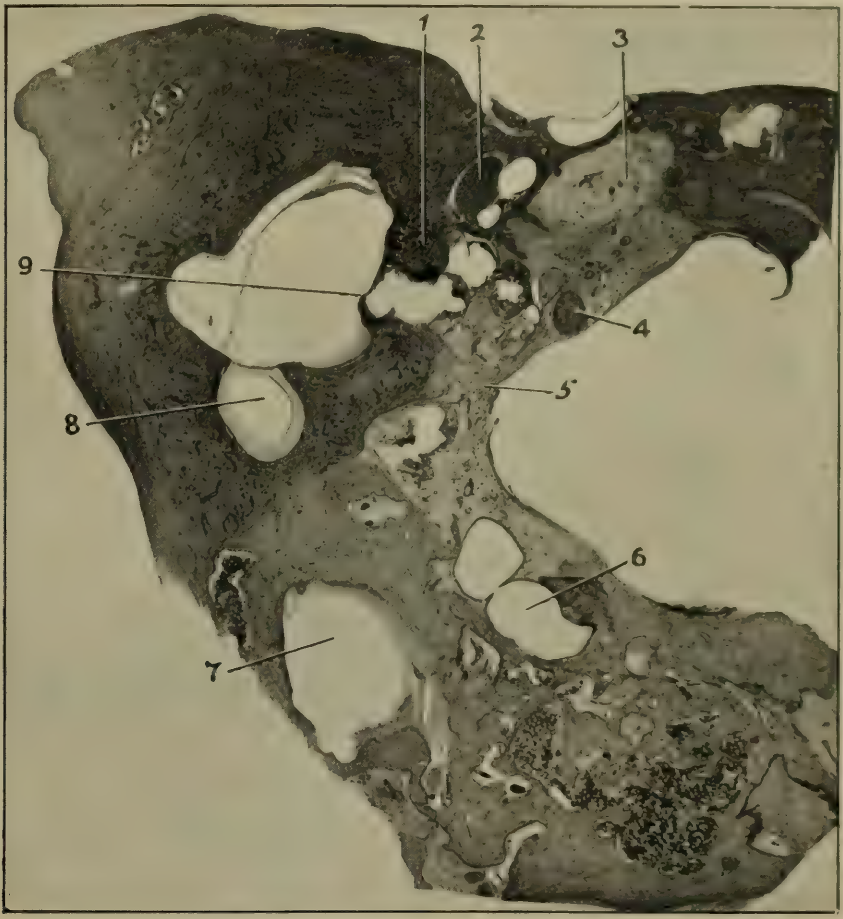


FIG. 13.

W. F. Vertical section of right ear, No. 300, × 6 diam. 1, area of otosclerosis; 2, facial nerve; 3, attic obliterated by connective tissue; 4, handle of malleus; 5, adhesion between scar in drumhead and inner wall of tympanum; 6, cystic spaces in lower part of tympanum; 7, jugular bulb; 8, ampullary end of posterior canal; 9, footplate of stapes not ankylosed.

Canals.—The canals are healthy. The posterior canal has been opened, and contains chips of bone (artefact).

Internal Meatus.—There is some meningitis in the internal meatus within the arachnoid sheath. The cells of the vestibular ganglion are normal.

Note.—This specimen shows that Lucae was right when he said that it was impossible to distinguish between a chronic adhesive process and otosclerosis—i.e., that the one condition ran into the other.

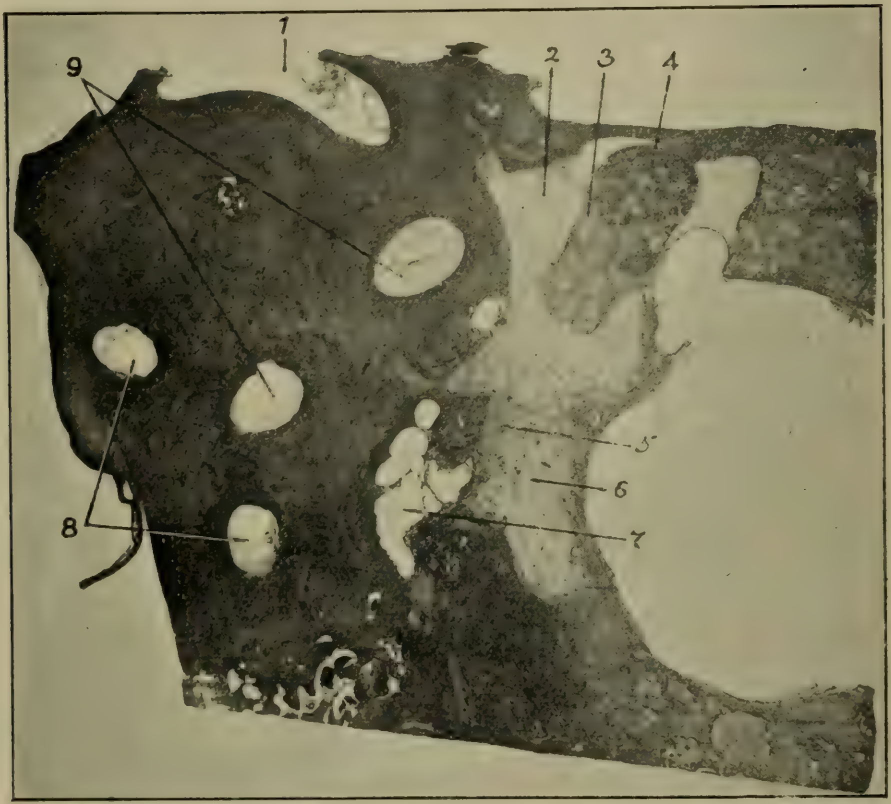


Fig. 14.

W. F. Vertical section of right ear, No. 355, × 6 diam. 1, superior canal; 2, connective tissue filling aditus; 3, incus; 4, head of malleus; 5, stapedius; 6, connective tissue in lower portion of tympanum; 7, sinus tympani almost free from connective tissue; 8, two ends of posterior canal; 9, two ends of lateral canal.

Microscopical Examination of Left Ear. (Chronic Middle-ear Suppuration with Otosclerosis, Fistula in Lateral Canal, Labyrinthitis, Double Vestibulotomy.) (*See* figs. 15—17.)

Tympanic Membrane.—The tympanic membrane was destroyed by the mastoid operation.

Eustachian Tube.—The Eustachian tube and tubal portion of the tympanic cavity are filled up by old connective tissue formation.

Ossicles.—The malleus and incus were absent or were removed at the mastoid operation. The stapes has evidently been displaced at the labyrinth operation and the footplate is seen lying in the vestibule.

Facial Nerve.—In the region of the geniculate ganglion the facial nerve is in contact with the granulation tissue which is infiltrating the marrow spaces above the cochlea. There is marked erosion of the bone of the facial canal just internal to the geniculate ganglion. Above the oval window the facial canal is very large and is full of granulation tissue, which appears to be compressing the nerve.

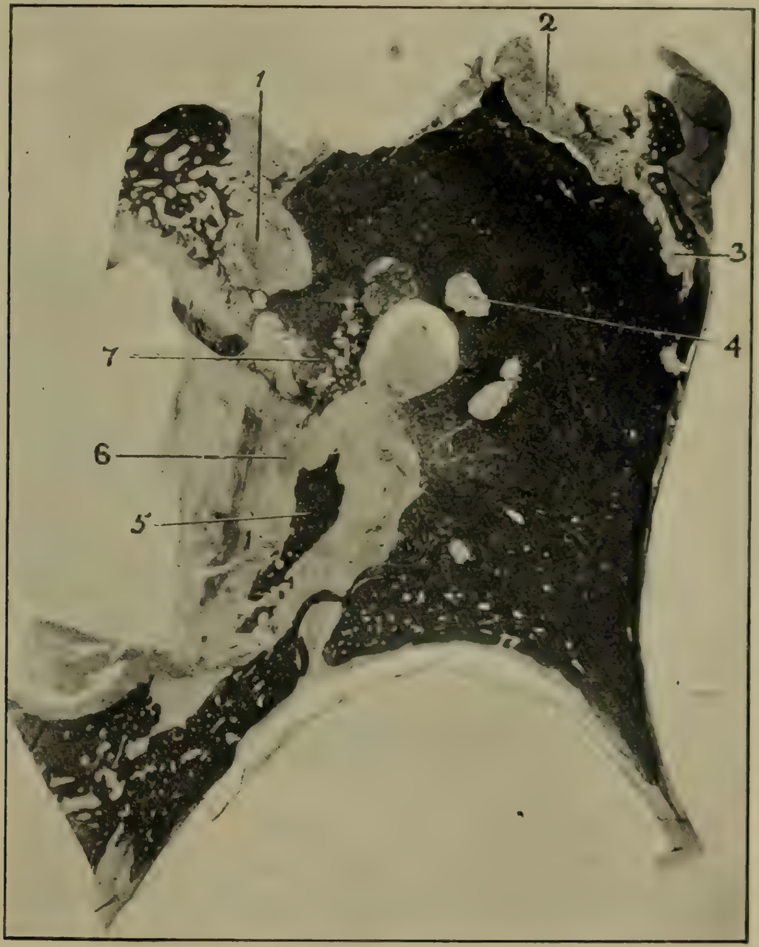


FIG. 15.

W. F. Vertical section of left ear, No. 160, × 6 diam. Note that on this side labyrinthitis was present, and the labyrinth operation (double vestibulotomy) had been performed. 1, facial nerve surrounded by granulation tissue; 2, granulation tissue in floor of middle fossa above the labyrinth; 3, area of osteomyelitis extending down internal to labyrinth and close to dura of posterior fossa; 4, area of osteomyelitis above and internal to vestibule; 5, chip of loose bone from labyrinth operation; 6, purulent exudate; 7, area of otosclerosis with enlarged vascular spaces due to recent acute inflammatory attack.

Labyrinth Capsule and Surrounding Bony Tissue.—The marrow spaces surrounding the cochlear capsule are very large and are filled by extremely vascular marrow, closely resembling granulation tissue. There is a layer of granulation tissue in the floor of the middle fossa above the cochlea and vestibule, with marked erosion of the surrounding bone. In front of the position of the oval window and just internal to the tensor tympani there is an area of deeply staining bone (otosclerosis). The spaces in the bone are very wide and are filled by connective tissue which mainly consists of small cells. It would appear that the otosclerotic area on the left side has become infiltrated with inflammatory tissue, probably as a result of mixed infection. Some giant cells are seen in the excavated areas of the otosclerotic bone next to the tympanic cavity. Internal to the vestibule there are several small areas of osteomyelitis in the labyrinth capsule.

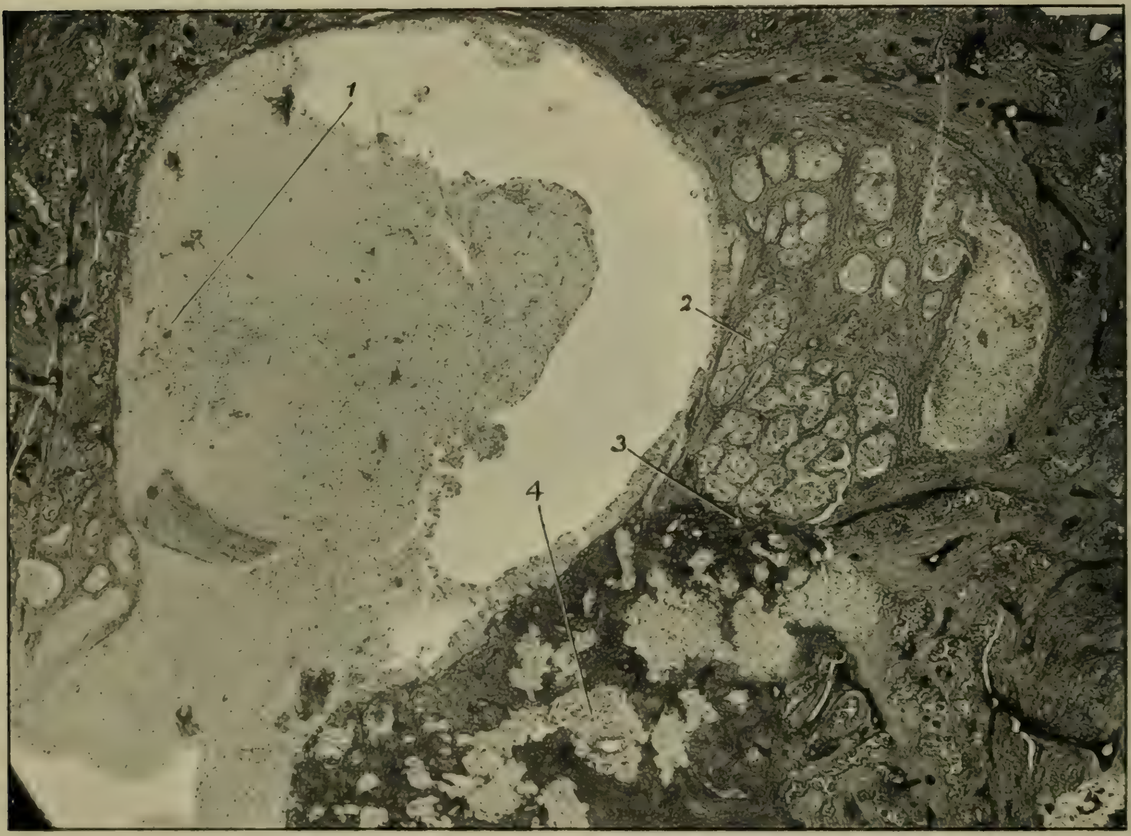


Fig. 16.

W. F. Vertical section of left ear, No. 160, × 35 diam. Higher power view of part of fig. 15. 1, purulent exudate in vestibule; 2, terminal branch of vestibular nerve; 3, upper end of otosclerotic area; 4, vascular space of otosclerotic area showing recent acute inflammatory infiltration.

Cochlea.—The cartilage bone capsule of the cochlea is healthy. The aqueduct of the cochlea towards its cranial end contains pus cells. The basal coil of the cochlea contains hæmorrhagic exudate in all three scalæ, and throughout the cochlea the scala media is full of blood. The basal coil near the vestibule contains chips of bone, resulting from the labyrinth operation.

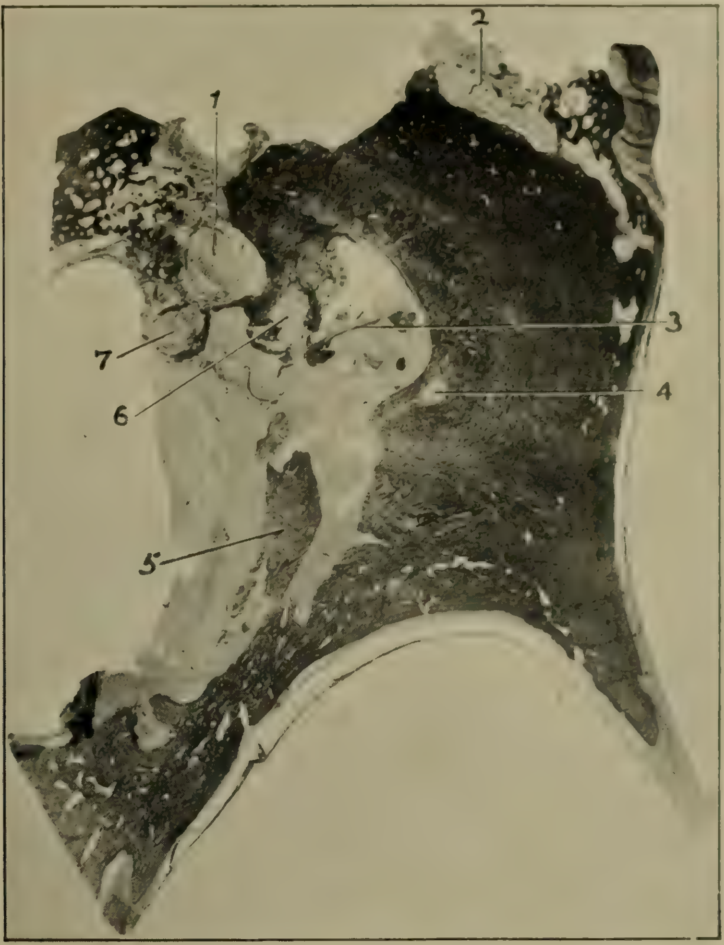


FIG. 17.

W. F. Vertical section of left ear, No. 185, × 6 diam. 1, facial nerve surrounded by inflammatory tissue; 2, granulation tissue in floor of middle fossa; 3, footplate of stapes displaced into vestibule at operation; 4, area of osteomyelitis in bone internal to vestibule; 5, chip of loose bone produced by operation; 6, otosclerotic area with recent acute inflammatory infiltration; 7, tensor tympani.

Vestibule.—The cavity of the vestibule has been opened and drained at the labyrinth operation, but contains some pus. The saccule and utricle have disappeared.

Canals.—The posterior part of the labyrinth, containing the canals, has been so much destroyed during the performance of Neumann's operation that it is impossible to give any accurate account of its condition.

Internal Meatus.—The nerves are infiltrated with pus.

Jugular bulb healthy.

It will thus be seen that there was an otosclerotic area in the usual situation in both ears. On the left side the patch of osteitis vasculosa showed very wide spaces, but this may possibly have been due to mixed infection associated with the labyrinthitis, or even with the labyrinth operation.

Otosclerosis associated with Fragilitas Ossium and Blue Sclerotics, with a Clinical Report of Three Cases.

By J. S. Fraser, M.B.

In the *Edinburgh Medical Journal*, April, 1917, Dr. Edith Bronson (U.S.A.) published an article on "Fragilitas Ossium and its Association with Blue Sclerotics and Otosclerosis." The paper contained a very full description of the condition and an exceedingly copious bibliography. It is therefore unnecessary to enter at length into an account of this "tripod" disease. I merely wish to call your attention to the association of otosclerosis with blue sclerotics and fragility of the bones, and to give a report of the clinical investigation of three cases.

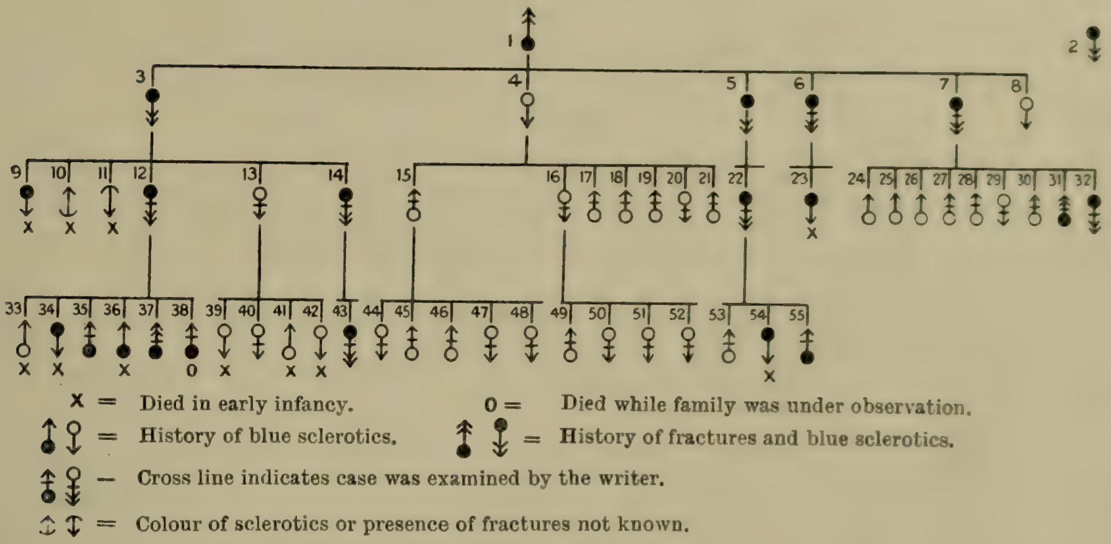
Dr. Bronson's article is mainly concerned with the Currie family. The grandfather, William Currie, broke his thigh at the age of 16, and during the next few years had many other fractures. His sclerotics were deep blue in colour and the frontal and occipital regions unduly prominent. He suffered from deafness.

William Currie had six children, all girls. Three of these suffer from the same conditions as their father, and one of these was examined by me (Case I). One other daughter has fragilitas ossium and blue sclerotics, but is not deaf, while the two remaining daughters have white sclerotics, normal hearing, and no history of fractures.

The third generation of the family consisted of twenty-four children born alive. Two of these have been examined (Cases II and III), both of whom were the daughters of the eldest child of William Currie. Twenty members of the third generation of the Currie family are still alive; of these, six show blue sclerotics and fragilitas ossium, though only three are stated to suffer from deafness.

The fourth generation of the Currie family are still in childhood, and, apparently, no deafness has as yet developed, but many of them show blue sclerotics. The condition of affairs in the Currie family is well shown in the accompanying chart, for the use of which I am indebted to Dr. Bronson and the editors of the *Edinburgh Medical Journal*:—

CHART 1.-THE CURRIE FAMILY.


X = Died in early infancy.
O = Died while family was under observation.
= History of blue sclerotics.
= History of fractures and blue sclerotics.
— Cross line indicates case was examined by the writer.
= Colour of sclerotics or presence of fractures not known.

55 individuals in this family. 35 of these examined by the writer. 21 of the 55 have blue sclerotics. Of these 21, 13 had fractures, 6 died in infancy without fractures, 1 is at present an infant, and one is a healthy boy of 6 years with no fractures.

Deafness present in Cases 1, 3, 6, 7, 12, 14, and 22. Only Cases 6, 12, and 14 were examined.

Case I.—Mrs. S., aged 49, has had over forty fractures of various bones and has distinctly blue sclerotics. Deafness started eight years ago after a cold. Patient stated that she was unable to hear for one week at this time, and was very miserable about it. When the cold went away the hearing in the left ear improved to some extent. She has never had any otorrhœa. She now complains of noises in the ears like "machinery," and states that she hears better in a noise. She speaks in a low well-modulated voice. Examination: The tympanic membranes show slight loss of gloss but no retraction. Marked redness of the promontory can be seen through the drumhead on both sides. Functional examination showed distinctly lengthened Schwabach, Weber lateralized to the left; Rinne negative on both sides. (C_{256} used for these tests.) C_{32} not heard by either ear by air conduction; C_{64} heard by left ear but not by right; C_{128} heard by both. C_{256} up to C_{2048} heard by both ears by air conduction—better by left ear than by right. Longitudinal vibrations of monochord not heard at all. Watch not heard by bone or by air conduction. The slightly raised voice is heard at 4 in. by the right ear when the left ear is closed by the finger. With the noise apparatus in the left ear the patient hears just as well or better than when the left ear is closed with the finger. The conversation voice is heard by the left ear at 18 in.

Case II.—Mrs. B., aged 39 (niece of Mrs. S., Case I), has suffered from deafness for twenty years. Patient noticed that her deafness got rapidly worse during her pregnancies. She states that she hears better in a noisy place, and that she hears worse on a dull day. She complains of a "whistling" sound in her ears. Examination: The tympanic membranes are almost normal, perhaps slightly indrawn and lustreless, but one can see the flamingo tinge of the hyperæmic promontory through the membranes. Functional examination with C_{256} showed a lengthened Schwabach, negative Rinne, and Weber's test lateralized to the right (worse ear). C_{16}, C_{32} and C_{64} were not heard by either ear.

Case III.—E. A., female, aged 35, has distinctly blue sclerotics and has had both "ankles" broken, but no other fractures. A sister, who comes with her, has had no fractures and is not deaf, though her sclerotics have a slightly blue tinge. This sister can hear C_{32}. The patient herself has been deaf since the age of 16 and the deafness has gradually increased. She has never had any otorrhœa. She states that the noises in her ears used to be very severe "like a big wheel crank going round." Patient is a mill worker and says that she can hear best in the mill. For the last year she has suffered from attacks of dizziness which are relieved by lying down. At these times she is very sick if she lifts her head up. The dizzy attack comes on with her monthly periods. Examination: The left drumhead shows a slight loss of gloss and retraction. There is, however, a suspicion of hyperæmia of the promontory. The right drumhead shows a distinct scar below the umbo, which points to an old attack of perforated otitis media and makes one very doubtful of the patient's statement that she has never had otorrhœa. Functional examination with the C_{256} fork shows a distinctly lengthened Schwabach, Weber lateralized to the right (better ear), and a negative Rinne in both sides. When the sounding fork is placed on the left mastoid the patient refers it to the right ear. C_{32} and C_{64} are not heard by either ear by air conduction. C_{128} heard by left ear not by right. C_{256} and C_{512} heard by both. C_{1024} heard by both ears, better by right. C_{2048} heard by right ear only. The longitudinal vibrations of the monochord are not heard at all by air conduction by either ear, but by bone conduction she hears the monochord up to 9,000 D.V.S. There is no spontaneous nystagmus and no Rombergism, but the patient would not submit to the rotation or caloric tests.

Dr. Bronson states that the term "fœtal rickets" was formerly used to include a group of conditions including osteogenesis imperfecta, achondroplasia, and cretinism. Osteomalacia is also allied to this group of diseases, though it does not appear so early in life. Osteogenesis imperfecta or fragilitas ossium occurs in two forms: (1) congenital and (2) late. These, however, cannot be very definitely separated.

Clinical Picture.—(1) In osteogenesis imperfecta of prenatal onset, the child is undersized, frequently premature, and is either stillborn or dies soon after birth. The head is a crepitant bag with only a mosaic of small plates for a bony covering. In infants which survive birth the ultimate shape of the head will depend upon the pressure to which it is subjected. There is often distinct bilateral enlargement which causes the ears to bend outward and downward. The frontal and occipital regions may also be prominent. (2) In the late form of the disease the stature of the patient is affected according to the age of onset. As a rule patients are of small stature. In certain instances of *postnatal* onset of fractures—so-called "idiopathic fragilitas ossium"—the shape of the head is similar to that in the congenital form, so that it is reasonable to suppose that in these cases also there has been imperfect prenatal osteogenesis. Ossification of the skull may be nearly normal, yet the extremities show many fractures, and vice versâ. The length of the long bones may or may not be affected, but the earlier the onset of signs of osteogenetic defect, the greater the shortening is likely to be. Hypotonicity of joints with dislocations may occur. The number of fractures, generally speaking, corresponds with the earliness of the onset. Spurway in 1896 and Eddowes in 1900 called attention to the association of blue sclerotics with a hereditary tendency to fractures. Congenital heart affections, cleft palate, hæmophilia, rickets, and early arteriosclerosis are frequently met with in such families.

Voorhoeve attributes all these conditions to hereditary inferiority of the mesenchyme, from which the skeleton, the sclerotics, the heart and blood-vessels, the lymph glands and vessels, the fibrous tissues and involuntary muscles are formed. In January, 1916, van der Hoeve and de Kleyb described deafness due to otosclerosis as an accompaniment of brittle bones and blue sclerotics. (The labyrinth capsule is of course a mesenchyme structure.) Burger, Adair Dighton and others have described cases in which nerve deafness was associated with fragility of the bones and blue sclerotics. Burger suggests that the stria vascularis —a mesenchyme structure—may be at fault. Burger, of course, wants to bring the deafness into line with the other mesenchymatous defects. It seems possible, however, that the patients may have been suffering from advanced otosclerosis with secondary nerve deafness and that the true nature of the ear lesion may have been overlooked. It is noteworthy that in Adair Dighton's case—a female aged only 23, an age at which nerve deafness is extremely rare—the deafness came on three months after child-birth.

Otosclerosis.—I have heard Dr. A. A. Gray state that in his opinion one person in every two hundred suffers from otosclerosis and I am quite willing to accept this estimate. Even if the disease is not so appallingly common as Gray thinks, every otologist must be aware that it is one of the most frequent and hopeless conditions with which he has to deal. For these reasons any line of investigation which may shed even a little light on the subject is well worth following up. The association of otosclerosis with defects of the mesenchymatous structures appears to be of great importance but I do not think that everything is thereby explained. Just as the fragile bone requires the application of some force before it breaks, so, in my opinion, the defective labyrinth capsule requires some infective agent before otosclerosis develops. There is much too great a tendency to attribute otosclerosis to one single cause alone—e.g., heredity, disorders of the endocrine gland system, toxin absorption, otitis media, or to a weakening of nerve influence. It seems quite likely that several or all of these causes may be combined. No one can deny that heredity plays an extremely important rôle. But on the other hand there are undoubtedly many cases in which no family history of deafness can be obtained. Our knowledge of the endocrine glands and of pathological chemistry is at present too vague for us to be able to dogmatize on these subjects, but apparently the hypophysis does seem to have some influence on the development and growth of bone. Gray holds that toxæmia plays an important part in the production of otosclerosis. Loss of nerve influence has been put forward by some as a most important factor in the production of the disease and Gray's recent book tends to emphasize this point. It is of interest to note that the female sex is specially affected by such conditions as osteomalacia, fragilitas ossium, and otosclerosis, and that pregnancy and the puerperium have a very prejudicial effect on the last of these conditions. The question of the importance of otitis media is much disputed. I hold that an attack of otitis media may be compared to "the match which fires the magazine." The hereditary tendency corresponds to "the powder." The loss of nerve influence and disorders of the ductless glands, which preside over the processes of bone formation and repair, may be compared to "a want of water with which to extinguish the flames."

BIBLIOGRAPHY.

BURGER. *Zentralbl. f. Gyn.*, 1903, xxvii, p. 374.

DIGHTON, ADAIR. *The Ophthalmoscope*, 1912, p. 188.

EDDOWES, A. *Brit. Med. Journ.*, 1900, ii, p. 222.

SPURWAY, J. *Brit. Med. Journ.*, 1896, ii, p. 844.

VAN DER HOEVE and DE KLEYB. *Nederl. Tijdschr. v. Geneesk.*, 1917, i, p. 1003.

VOORHOEVE. *Nederl. Tijdschr. v. Geneesk.*, June, 1917.

DISCUSSION.

Dr. ALBERT GRAY: Mr. Fraser asked whether what he indicated on the picture of one of the sections was an area of otosclerosis. It struck me that that was otosclerotic bone, but some parts appeared to be much more deeply stained than others, though sometimes one gets that in otosclerosis. I think otosclerosis was present in both temporal bones. The disease is nearly always bilateral. With regard to the question of heredity, and the association in the same person of blue sclerotics and fragilitas ossium, the question there in point is whether there is a single factor producing both those conditions, or whether they show variations in the individual independent of each other. These are liable to be transmitted, though they may be independent of each other. There is no connexion between blue irides and otosclerosis, for example, but these qualities like all others are liable to transmission. It may be that in the members of those families these conditions are a peculiarity. In the family of a medical man in Glasgow otosclerosis is one variation, and another variation in it is hammer-toe. Otosclerosis and hammer-toe have been handed down through three or four generations, but there is no necessary connexion between the two. With regard to Mr. Fraser's suggestion as to the possibility of a compromise in view, what I have felt all along is that in otosclerosis we have a tendency in the individual, but, as he says, one of various things may be the "match" which sets light to the magazine. In my book I quote a case in which hereditary otosclerosis has gone through many generations in an historic family. In the member of the family I saw—a female—there was acute middle-ear inflammation on one side at 18 years of age, and instead of the condition improving otosclerosis and noises in that particular ear progressively developed forthwith. But the other ear did not become affected until sixteen years later. In both ears there was typical otosclerosis. That illustrates what Mr. Fraser said: there is the powder, and given the match the disease is liable to be started.

Mr. SYDNEY SCOTT: In considering the question of heredity and ear disease, it may be that an important factor in the causation of familial deafness is some structural departure from the normal, not merely in the ear itself but in the nose or nasopharynx. For example, among certain families prone to post-nasal catarrh and subsequent deafness, I have met with precisely the same deformity of the nasal septum which produced decided nasal obstruction in father and son and was associated with the catarrh which led to subsequent deafness. In his studies of familial otosclerosis, has Dr. Gray noticed any similar structural peculiarities, which may have favoured local infections at certain periods of life, and led to the deafness and changes in the ear such as Mr. Fraser has demonstrated?

Mr. FRASER (in reply): I disclaim any idea of being a Mendelian expert but I do not think that the connexion between the fragility of the bones and blue sclerotics on the one hand, and otosclerosis on the other, is merely a matter of accident. I would like to refer Dr. Gray to the reference I gave to the Dutch family in which these three conditions were associated. He will then see that Dr. Bronson's cases are not the only cases on record. Further, there are other cases in which blue sclerotics and fragility of the bones have been associated with deafness—said to be nerve deafness. I should like very much to examine these patients to ascertain whether they are really cases of nerve deafness. I think it probable that they are advanced cases of otosclerosis with secondary nerve deafness. Dr. Kerr Love has shown that in congenital deafness (congenital deaf-mutism) the epiblastic structures are at fault, and that mental deficiency, epilepsy, albinism and defects of the nervous structures of the eye are frequently associated with this form of deafness. In these cases, then, we have a congenital weakness of epiblastic structures. On the other hand, there seems some reason to suppose that in otosclerosis we have to deal with a congenital weakness of the mesenchymatous tissues, and the case records which I have brought before the meeting to-day appear to be excellent examples of this. With regard to the simile of the "match kindling the magazine" Dr. Gray wants me to say that anything may constitute the "match." I cannot do this for I believe that it is otitis media which corresponds to the match. I have shown to-day, and on previous occasions, what I take to be the inflammatory condition of the bone in the anterior margin of the oval window in cases of otosclerosis, and I want to renew the challenge which I formerly made. I propose that Dr. Gray, Mr. Jenkins and I should submit our specimens of otosclerosis to pathologists and ask their opinion as to the nature of the bone disease present. I myself do not see how that bony overgrowth with the big vascular spaces can be anything but inflammatory. I do not understand how "idiopathic nerve weakness" can give rise to an area of new bone formation in front of the oval window. I believe that we have to deal with an inflammatory condition—the result of former attacks of catarrhal or suppurative otitis media. I have now shown before this Section three cases of otosclerosis in which middle-ear suppuration was present and I must remind Dr. Gray that in three of the four cases mentioned in his book there was otitis media present at the time of death. I do not claim that the middle ear is always in a state of catarrh or suppuration. In many cases the inflammatory process in the tympanic cavity apparently passes off entirely but it leaves behind a chronic infection of the deep layer of the mucoperiosteum in the anterior margin of the oval window, which results in the bony changes we know as "otosclerosis." In people with no hereditary tendency to otosclerosis, otitis media in the great majority of cases clears up entirely or at most leaves a little thickening or opacity of the drumhead. In people with the hereditary otosclerotic tendency, and even in some without such an hereditary tendency, the effects of otitis media do not entirely pass away but leave behind a small focus of disease which gradually extends.

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No. 15.

Section of Pathology.

President—Dr. W. BULLOCH, F.R.S.

On Polymorphism of the Malignant Epithelial Cell.[1]

By E. H. KETTLE, M.D., B.S.

(From the Pathological Department, St. Mary's Hospital.)

THE adoption of modern experimental methods has so revolutionized the study of malignant disease that it is now possible to carry out extensive investigations without paying more than the most superficial attention to the microscopic structure of tumours. Nevertheless, all cancer research must ultimately rest on a histological basis. In the clinical laboratory, where the available material can scarcely be submitted to experimental conditions, the fundamental importance of histology is unchallenged. The pathologist must depend mainly upon the microscope to distinguish between innocency and malignancy, and should he desire to pursue broader aims than the purely utilitarian his work is still practically restricted to histology. This line of research, however, is far from being exhausted. In classification alone, much remains to be done in the way of separating the true neoplasms from those blastomatoid conditions which so much resemble them, and give rise to so much confusion in our conceptions of tumour formation. Again, by a careful consideration of their microscopic structure, it is possible to discover a great deal about the biological properties of tumours, and the influences they exercise upon the healthy tissues in which they grow. Finally, it is of the greatest importance to correlate with human pathology the results of experimental research. But for any work along these lines to be fruitful, it is essential that it should rest upon a sure foundation of wide and accurate histological knowledge.

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[1] At a meeting of the Section, held April 15, 1919.

The subject would be less difficult, and less interesting, were the growth of the malignant cell invariably regular, but this is far from being the case. The majority of adenocarcinomata may exhibit much the same structure, but examples are met with from time to time in which the tumour cells possess a varying degree of polymorphism which may even be so extreme as to make the correct classification of the growth a matter of the greatest difficulty.

That the malignant epithelial cell is capable of polymorphism is perfectly well recognized. The interchangeability of the acinous and the solid structure in adenocarcinomata is familiar to every one, and the origin of a squamous-celled carcinoma from columnar epithelium has been reported on several occasions [1] [2]. Greater variations than these, however, are not as a rule considered possible. It is true Krompecher [3] holds that under certain conditions of growth and environment epithelial cells may assume a spindle form and may actually be converted into connective tissue elements, but his views have not found general acceptance, and the doctrine of the specific nature of cell growth is not seriously questioned.

Without going so far as to claim that the adult epithelial cell can actually become changed into a connective tissue cell, I am convinced that some carcinomata may possess such extreme powers of polymorphic growth that their cells, losing all trace of their epithelial origin, may become indistinguishable from connective tissue elements. This has been observed in the propagation of certain carcinomata in the mouse [4], and though the limits imposed upon the study of human tumours makes the proof of a similar process in them much more difficult, it can be demonstrated, as I shall hope to show, with a considerable degree of certainty.

The recognition of this power of polymorphic growth is particularly important in the study of those cases in which multiple malignant tumours occur simultaneously in the same individual. Examples of this condition are not very rare [5] [6], but in most of them the different growths are widely separated anatomically, and, biologically, appear to be equally independent.

Of more interest are those instances of multiple tumours occurring in the same organ when the growths are in actual contact with one another, since there is always the possibility that the presence of one of them may have been the factor in determining the genesis of the other.

This would seem to be the more likely from the demonstration by Ehrlich and Apolant [7], Haaland [8], Russell [9], and others, that during the course of propagation of certain carcinomata of the mouse the stroma may assume sarcomatous properties. Taylor and Teacher [10], in a report of seven cases of multiple tumours in the human being which had come under their notice, believed it justifiable to assume a causal relation between the neoplasms in, at any rate, some of them. Their tumours, however, and others reported of a similar nature, would appear to be open to the criticism that in each case the neoplasms seem to arise as separate entities, whereas in the development of sarcomata during the propagation of carcinomata the change in the stroma has taken place in the centre of the carcinoma, so that the two growths are intimately mixed. It is true that Stahr [11], in a case studied by him, found sarcoma development taking place at the periphery of a carcinoma, but this is exceptional, and the fact remains that the human tumours differ from the experimental in that their constituents are in juxtaposition rather than in combination.

Very rarely, however, double tumours occur to which this criticism cannot apply, for the carcinomatous and sarcomatous elements are so closely blended that it is impossible to separate them. These neoplasms usually known as "carcinoma-sarcomatodes," or "mixed tumours," have, of course, nothing in common with the complex embryomata which arise, for example, in the testicle. They are essentially carcinomata in which the stroma has sarcomatous properties, and bear a close resemblance to the mixed tumours which develop in the course of propagation of carcinomata in mice.

In man, true mixed tumours are extremely rare. Herxheimer [12] published a case where one occurred in the œsophagus and collected reports of about twenty others. Saltykow [13] demonstrated three cases before the German Pathological Society at Munich in 1914, and referred to twenty-five cases which had been reported.

On reading some of the reports of multiple and mixed tumours I have often thought it possible to offer an alternative explanation of the authors' findings. A suspiciously high proportion of the cases have occurred in the thyroid gland and the uterus, the tumours of which organs are notoriously prone to present unusual features. Many of the reporters appear to have rigid conceptions of the morphology of the malignant cell, and, though they have hastened to accept and apply to their own material the researches on sarcoma production of the experimental laboratories, they have paid little attention to those other observations which have demonstrated the extreme powers of polymorphic growth possessed by the malignant epithelial cell. Where it is possible to study the growth of these tumours experimentally, doubtful points may be cleared up and satisfactory conclusions arrived at; but with human material this is, as yet, not practicable. One sees the tumour in only one phase of its growth, and it may be impossible to interpret what is seen.

In these circumstances it must be realized that conclusions drawn from the study of human tumours should be much more critically examined before they are accepted than those arrived at from the study of experimental tumours, which can be observed under conditions enormously more favourable.

In the last twelve years a large number of tumours have passed through my hands, including many possessing quite unusual features. Some of these, from the complexity of their structure, would usually be regarded as "mixed tumours." There is, however, another possibility, and I think it is more reasonable to explain them as instances of extreme polymorphic growth of carcinomata.

Absolute proof is, of course, impossible in the absence of any method which would enable one to study their behaviour on prolonged transplantation, but there is no doubt in my own mind that my interpretation is correct. In any case I consider it most important to make allowance for the morphological elasticity of the epithelial cell in interpreting any anomalous growth. Failure to do this can only lead to erroneous conclusions, and if the study of human cancer is to help at all in the solution of the problem as a whole, the facts upon which our theories are based must be beyond criticism.

The tumours which I have selected to illustrate my point lend themselves to analysis fairly easily, and though I cannot hope to convey by a few figures the impression formed from the study of many series of sections, I have tried to bring forward the salient points as clearly as possible.

Case I.—Pathological Register, St. Mary's Hospital, 709, 1908.

Adeno-carcinoma of the Thyroid Gland disseminating as a Polymorphic-celled Sarcoma.—The patient, a woman, aged 52, had noticed a swelling on the right side of the neck, gradually increasing in size for three months. It was accompanied by some alteration of the voice but very little pain. The patient was admitted to St. Mary's Hospital on November 7, 1908, under the care of Mr. Maynard Smith, who operated on November 14, removing a large mass which included the right lateral lobe of the thyroid gland and the carotid vessels. Death occurred from broncho-pneumonia on November 19, and at the post-mortem metastases were found in the cervical glands, the superior mediastinum, the glands in the posterior mediastinum, and the root of the left lung, and in the base of the left lung. Sections taken from the metastases found at the post-mortem, and from the periphery of the mass removed at the operation, show a malignant growth, having the structure of a polymorphic-celled sarcoma (fig. 1). The cells are extremely irregular in size and shape, and many multinucleated giant cells are present. In some places the cells are loosely packed together in alveoli, but elsewhere, especially in the thoracic deposits, they show no grouping at all, and are separated from one another by connective tissue. The nuclei vary in their structure, and often contain unusually large nucleoli. Hyperchromatic and pycnotic forms are common, and mitoses are numerous and atypical. Degeneration forms and complete necrosis occur with great frequency. An examination of the lateral lobe of the thyroid gland removed at the operation reveals an entirely different picture,

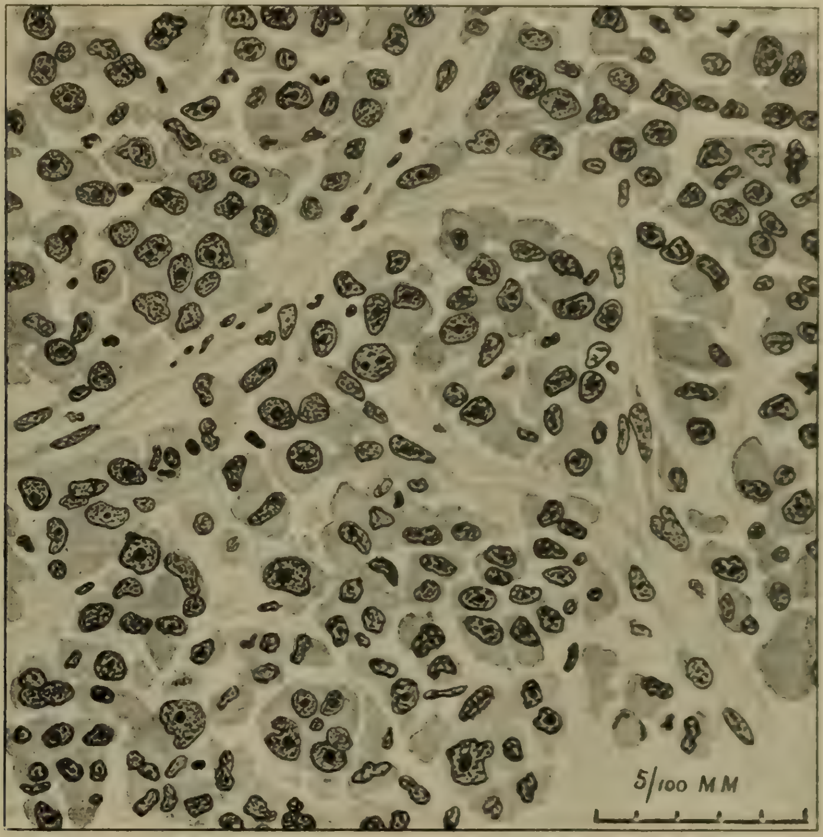

FIG. 1 (Case I).

Metastatic deposit of tumour of thyroid in a cervical lymph gland. The growth has the characters of a polymorphic-celled sarcoma and shows no signs of its epithelial origin.

Sections from this region show a malignant growth which is infiltrating the normal thyroid tissue and the internal jugular vein, but has the structure of an adenocarcinoma originating from the thyroid gland (fig. 2). It is composed of cubical cells having regular spherical nuclei. These cells have a very constant tendency to be arranged round vesicles which contain a substance indistinguishable in appearance and staining reaction from the normal colloid of the thyroid gland. In places, however, the growth loses its vesicular character and assumes a solid alveolar structure. In one area the vesicles become dilated: their colloid contents disappear, and their lining cells tend to grow into the acini in a papillomatous manner. In part of the growth the stroma is very scanty, consisting of occasional connective tissue trabeculæ, and delicate capillaries which penetrate between the cells of the parenchyma.

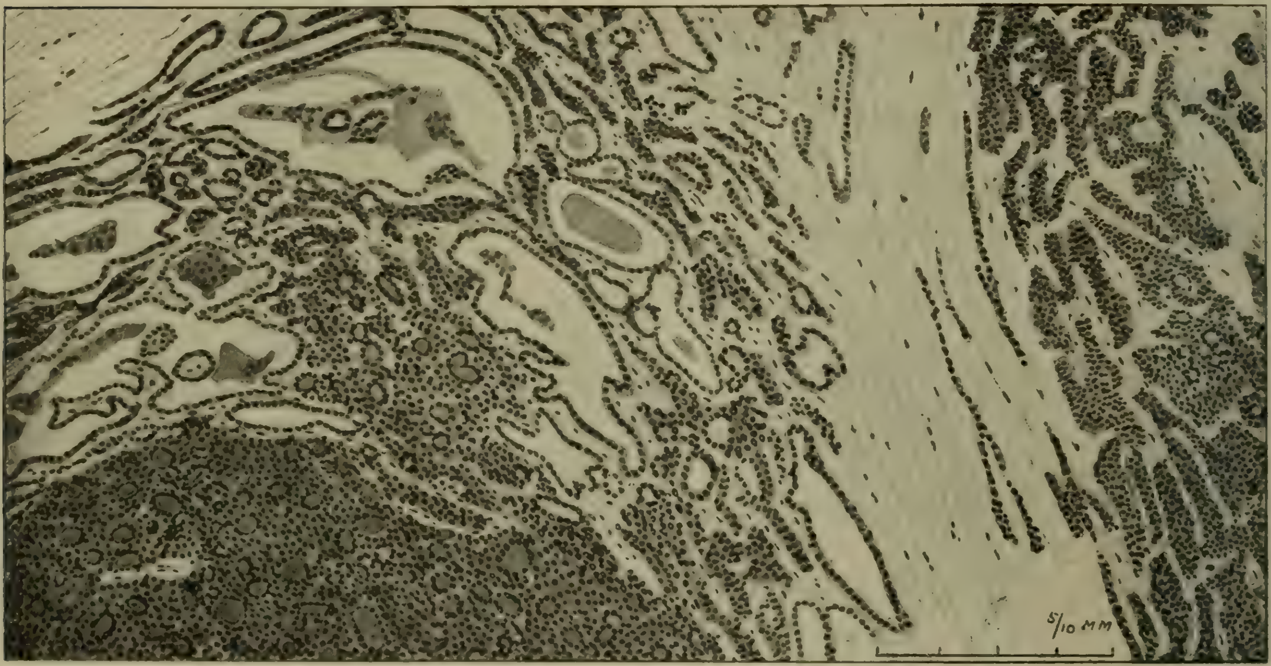

FIG. 2 (Case I).

Section of the primary growth, showing vesicles containing colloid, dilated acini, and solid trabeculæ.

In some places this portion of the growth presents more abnormal characters. Its stroma becomes more abundant and its cells assume a trabecular arrangement, as seen in fig. 2, or large cells having a finely reticular cytoplasm may be met with (fig. 3). These cells have no counterpart in the normal thyroid gland, but their origin from the cells of the growth can be definitely traced, and they may even be arranged around small colloid-containing vesicles.

At first glance it would seem that this tumour is a carcinoma of the thyroid associated with a polymorphic-celled sarcoma, which may or may not have originated in its stroma, and would thus fall into line with similar tumours reported by Wells [14], and Taylor and Teacher (loc. cit.). This, however, is not the case, for it can be shown quite clearly that the sarcomatous part is derived directly from the carcinoma. Fig. 2 shows the transition of the vesicular type of growth into the solid or trabecular type, and in fig. 4 (taken from a gland at the periphery of the mass removed), poly-

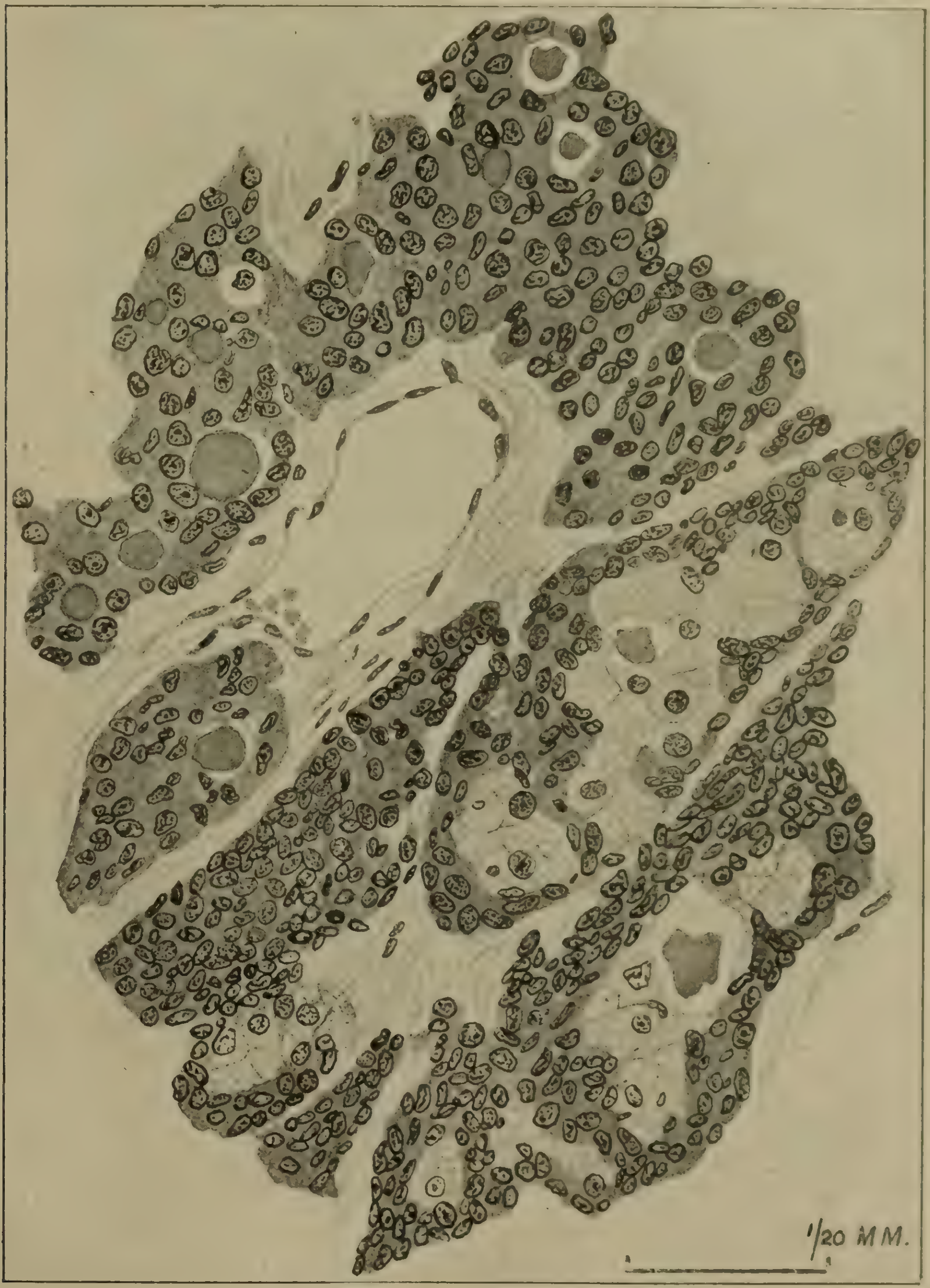

FIG. 3 (Case I).

Primary tumour showing solid and vesicular growth, and clear reticular cells, some of which surround spaces containing colloid.

morphism becomes still more advanced. To the left of fig. 4 the carcinoma cells can be seen arranged in small columns or alveoli lying in a fairly abundant fibrous stroma. To the right of the figure the groups of cells become larger, and the stroma is reduced to delicate strands of connective tissue.

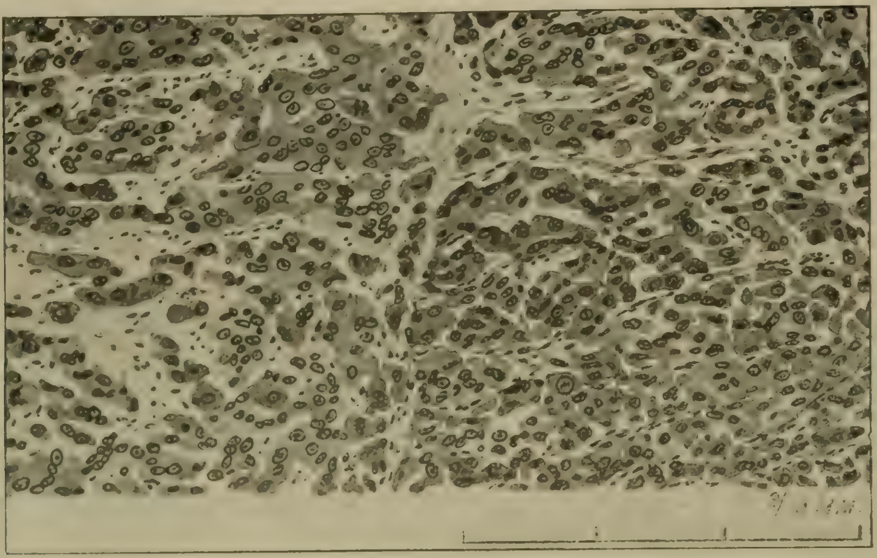

FIG. 4 (Case I).

Metastatic deposit in a cervical lymph gland. To the left of the figure the carcinoma cells are grouped together in trabeculæ; to the right, a gradual transformation occurs, till the sarcomatous type of growth illustrated in fig. 1 is fully developed.

CASE II.—PATHOLOGICAL REGISTER, ST. MARY'S HOSPITAL, 693, 1914.

Adenocarcinoma of the Breast with Giant-celled Sarcomatous Stroma.—The patient, a woman, aged 58, was admitted into St. Mary's Hospital under the care of Mr. Ernest Lane. She was a multipara, her youngest child being 17 years old. There was no history of any previous local trouble. The tumour, which had been noticed for two months, formed a well defined elastic swelling in the upper and outer quadrant of the left breast. The axillary glands were slightly enlarged. Local excision was performed, but as the result of the microscopic examination, the whole breast, together with the contents of the axilla, was removed ten days later. The tissues removed at the second operation were thoroughly examined, but no growth was found in the breast itself or in any of the axillary glands. The material from the first operation consisted of a small mass of breast tissue surrounding a firmer area of new growth, which was roughly oval in form, measuring about 3 cm. in its longest diameter, but was ill defined, blending imperceptibly with the surrounding mastitic breast tissue.

Microscopic Examination.—The breast shows advanced chronic mastitis with atrophy of the glandular elements, and an increase of dense fibrous stroma. Occasionally, in the neighbourhood of small vessels, and around groups of acini, there occur small accumulations of lymphocytes and plasma cells. There are also to be seen small collections of black and brown pigment granules, either enclosed in phagocytes or lying free in the connective tissue. These are especially numerous in the periphery of the tumour, but are never found in association with the giant cells to be described later. They give the iron reaction, though poorly, and appear to be of no importance beyond indicating some previous lesion, possibly an old injury.

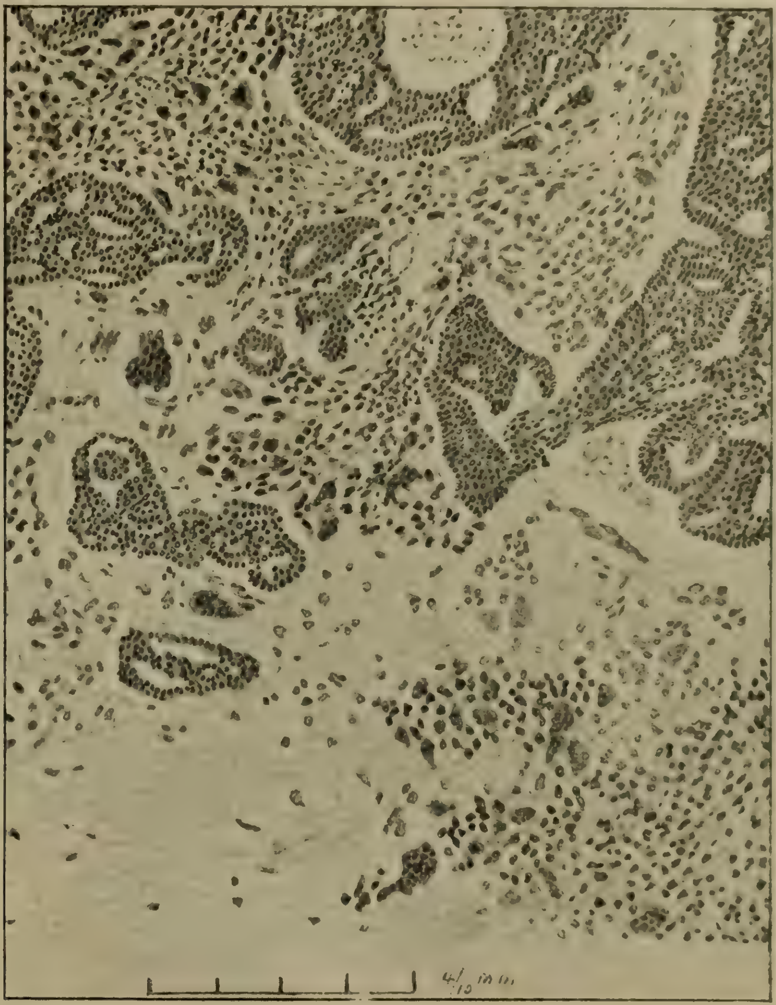

Fig. 5 (Case II).

Section of tumour showing an adenocarcinoma lying in a giant-celled sarcomatous stroma.

The tumour itself presents a complex histology (fig. 5). The most obvious feature is the presence of an epithelial new growth, an adenocarcinoma which conforms in every respect to a common type of mammary carcinoma. It is composed of spheroidal or cuboidal cells, fairly uniform in size, and possessing a single spherical nucleus; the cells are grouped together in alveoli or trabeculæ. Some of the alveoli are solid, but for the most part there is a distinct tendency to an acinous structure. The acini are not always regular. They may be dilated and elongated, or folded and compressed, but the adenomatous nature of the growth is everywhere apparent. The stroma varies considerably in structure in different parts. It is always abundant, and may be highly cellular, but in places it is dense and almost hyaline in appearance. But the peculiar feature of the stroma is the presence of extremely cellular areas apparently sarcomatous in nature (fig. 6). Their most notable constituents are large giant cells, very similar in appearance to the giant cells of a myeloma. They are very irregular in shape, with a finely granular cytoplasm and very many, often several dozen, small rounded or oval nuclei. Associated with them are other cells which occur in great numbers and are extraordinarily variable in shape and size and in the number and form of their nuclei. In many of them mitotic figures can be seen, and degeneration forms are common. Though their size throws the giant cells into prominence, no hard and fast line can be drawn between them and the smaller cells. It is always possible to distinguish intermediate forms, and there can be no doubt that they are derived from one and the same source. The

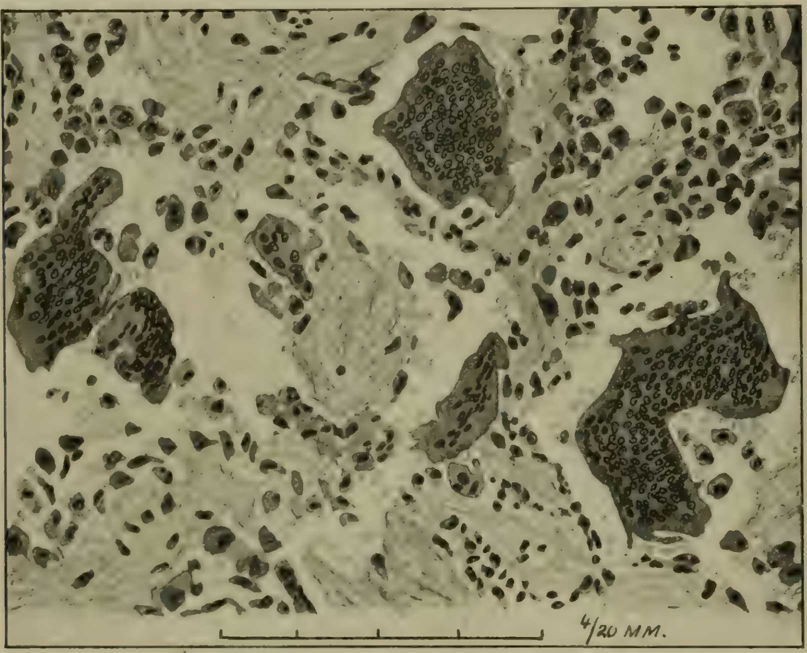

FIG. 6 (Case II).

High-power view of the stroma, showing large giant cells and the smaller cells lying in clefts in the stroma.

only comparable case with which I am acquainted is one reported by Schlagenhaufer [15] of an unmarried woman, aged 50, who had two distinct tumours in the left breast. One had the structure of a giant-celled sarcoma, the other was a carcinoma. Though the tumours were separate, in numerous places the carcinoma spreads into the sarcoma. The axillary glands were examined later, when some of them were found to contain mixed metastases. From his description, and the figure illustrating his article, Schlagenhaufer's case appears to be similar to mine. But whereas he states explicitly that the two growths are quite distinct, and regards their simultaneous occurrence in the same organ as merely a coincidence, in my case the tumours are intimately blended, and it would seem that we have to deal with a carcino-sarcoma. Tempting speculations as to development of a sarcoma in the stroma of a carcinoma are, however, rendered superfluous by a more careful examination of the growth, for I think it is clear that this is not a "mixed tumour," but is an example of epithelial polymorphism. I have already said that there is no distinction except that of size between the largest giant cells and the isolated "sarcoma cells"; transitional forms can easily be distinguished. This is well seen in fig. 6, where both types of cell are lying free in large clefts or spaces in the dense fibrous stroma. Similarly, it is possible to make out the origin of these elements from the carcinoma cells. In fig. 7 groups of "sarcoma" cells are shown lying loosely packed together in irregular spaces in the stroma without any intercellular tissue whatever. Many of them retain actual contact with one another and conform more to the epithelial than

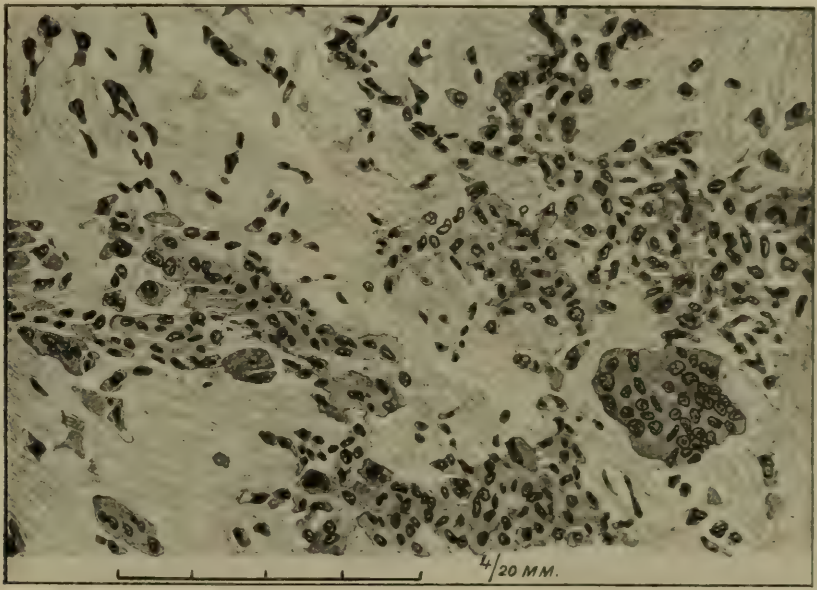

FIG. 7 (Case II).

Showing the formation of the "sarcomatous" tissue by a process of loosening and fraying out of the carcinoma cells.

to the mesoblastic type, but at the periphery of the spaces they tend to separate into isolated elements which become spread out in the meshes of the stroma. The proof that these cells are carcinomatous in nature is obtained by comparing this section with earlier and later ones of the series, when it becomes obvious that they are derived from carcinoma alveoli by a process of loosening and fraying out of the peripheral layers. The remains of such an alveolus can be seen in the lower right hand corner of the figure, and by following it through the series the separation of its superficial cells into loose isolated elements can be distinguished with certainty. In another series of sections it is possible to trace the direct origin of the giant cells from the carcinoma. Fig. 8 shows acini arranged in a chain in the dense stroma around a small capillary. Traced through the series this ring of growth is seen to be complete, but in the field illustrated there is a small gap to the left of the figure, and immediately above this the carcinoma cells have fused together, their protoplasm has become finely granular, and their nuclei have multiplied, with the result that giant cells are formed, differing in no way from those seen elsewhere in the tumour. In other sections of the series

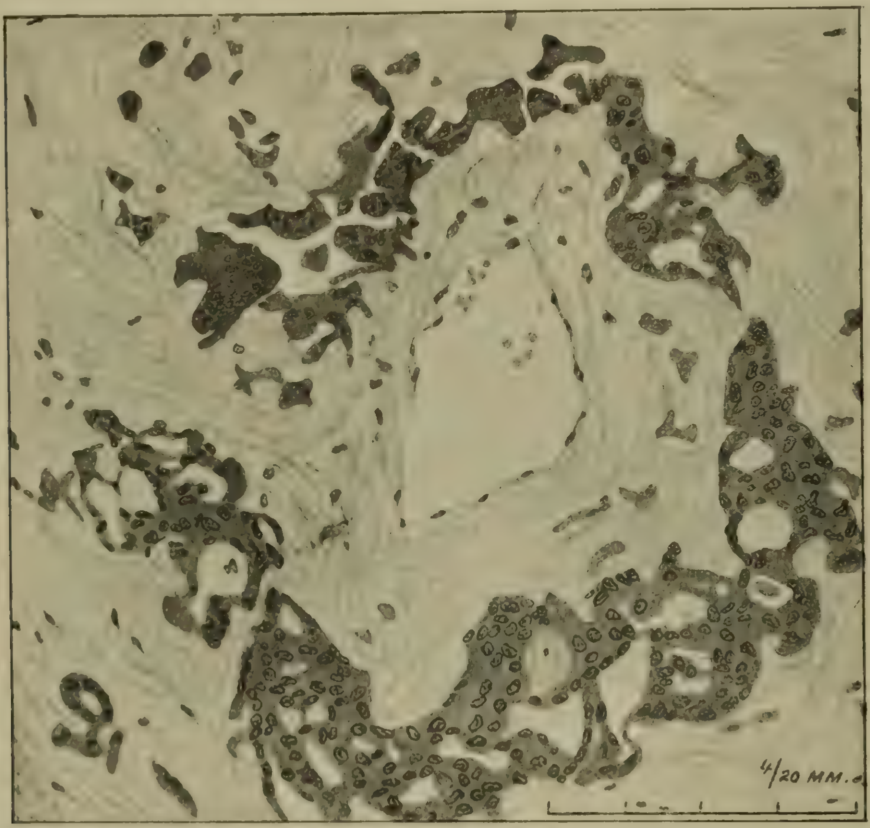

FIG. 8 (Case II).

Showing the formation of the giant-cell elements of the stroma by a process of fusion of the carcinoma cells with proliferation of their nuclei.

the giant cells are replaced by carcinoma acini, and it also becomes abundantly clear that there is no question of replacement by invasion of the carcinoma by sarcoma.

Here again, then, what at first sight appears to be a "mixed tumour" is shown by more careful examination to be an example of polymorphism.

Case III.—Pathological Register, St. Mary's Hospital, 807, 1917.

Adenocarcinoma of the Uterus: Polyp showing Areas of Squamous-celled Carcinoma associated with a Sarcomatous Stroma.—The patient, a married woman, aged 56, was under the care of Mr. T. G. Stevens, who performed a hysterectomy. The uterus was slightly enlarged, and was the seat of a firm white growth which involved the greater part of the body, extending almost to the peritoneal surface. The cervical canal was normal. The endometrium was extremely hypertrophied and shaggy, and springing from the posterior wall in the region of the fundus were two small polypi. There was no extension of the growth into that portion of the uterine wall from which the polypi sprang. The tumour is an adenocarcinoma. It is composed of irregular folded and branching acini and extends throughout the whole thickness of the wall. The cells lining the acini are variable in size and shape. Occasionally they are columnar with a darkly staining protoplasm and a nucleus situated at the base of the cell, but more often they revert to a transitional-cell type, being cubical, pear-shaped, or spherical, with a clear, lighter-staining protoplasm and a centrally placed nucleus. In many cases the cells are heaped up so as to form small papillomatous ingrowths, and in some of the acini they have broken loose and lie free in the lumen. There is no true metaplasia into squamous epithelium: prickle cells are absent and typical keratinization does not occur. But there is more than a suggestion of such a change in many of the large spherical cells with clear nuclei and clear protoplasm, and occasionally cells are seen exhibiting hyaline degeneration which is difficult to distinguish from keratinization. The hyperplasia of the endometrium is extreme, and the picture is further complicated by the fact that there is an irregular invasion by the malignant acini, which blend with the hypertrophied glands, making it impossible to distinguish with certainty any abnormality in the way of "malignant transformation" of the endometrium itself.

The chief interest of the case, however, is in the histology of the polypi springing from the fundus. Their general structure can be seen in fig. 9. They contain no glands but are solid, consisting of cellular tissue which has a variable and atypical structure. Over a large area it consists of a delicate collagenous matrix in which lie oval or fusiform cells. There are numerous formed capillary vessels and occasional groups of small round cells. The most striking feature of this part of the tumour is the presence of irregular giant cells with numerous nuclei of various shapes and sizes (fig. 9 [A], fig. 10). These cells have a faintly staining protoplasm which in some cases has undergone a globular hyaline degeneration. In other places the cells have a regular oval form and are grouped in a manner which recalls the structure of a spindle-celled sarcoma. Many of these are undergoing mitosis. The tissue was sufficiently fresh to stain for fibroglia fibrils, but none were found in relation to these cells. On a small tongue-like process at the side of the main polyp

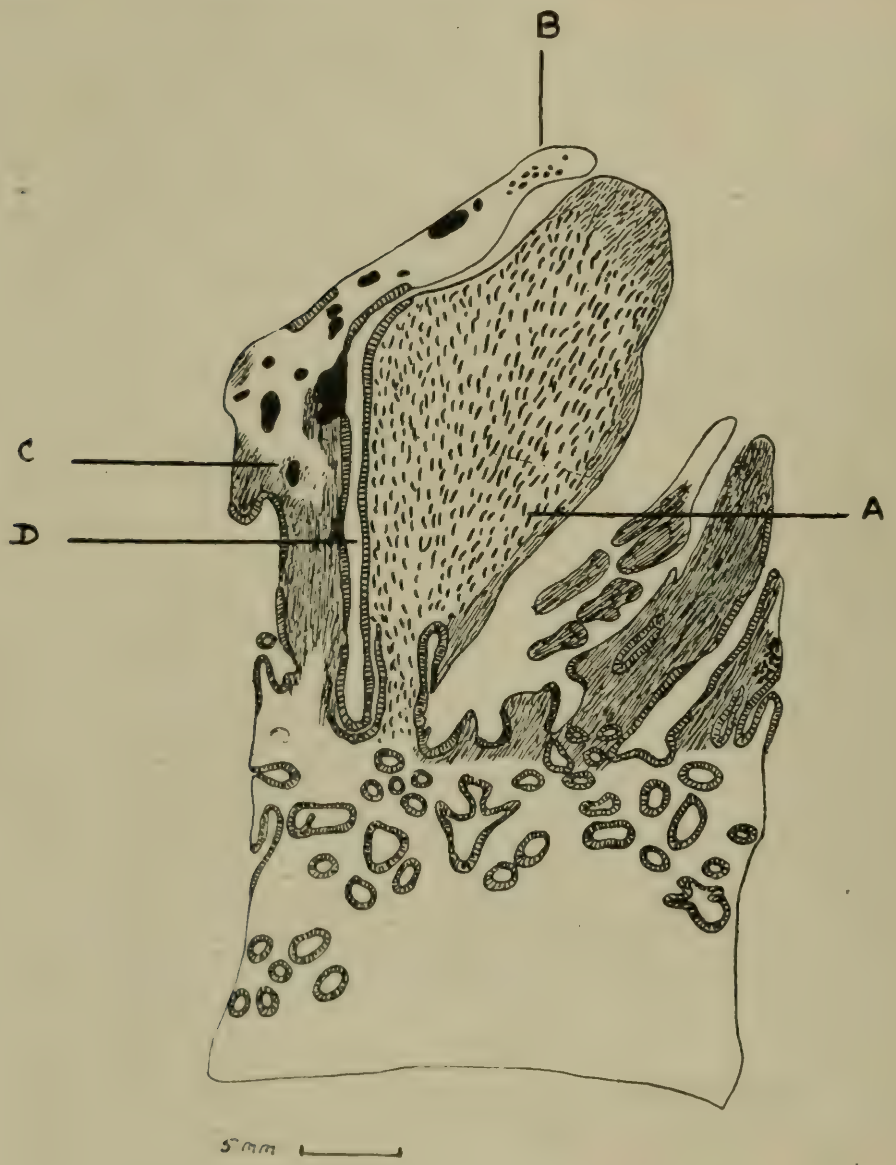

FIG. 9 (Case III).

Low-power view of polyp, semi-diagrammatic, showing A, giant and spindle-celled structure; B, giant cells in hyaline stroma; C, covering columnar epithelium with squamous metaplasia; D, downgrowths of squamous epithelium.

the stroma is abundant and hyaline in character. Here occur small groups of giant cells (fig. 9 [B], fig. 11) similar to those already described as present in the sarcomatous area. The presence of masses of squamous epithelium, often

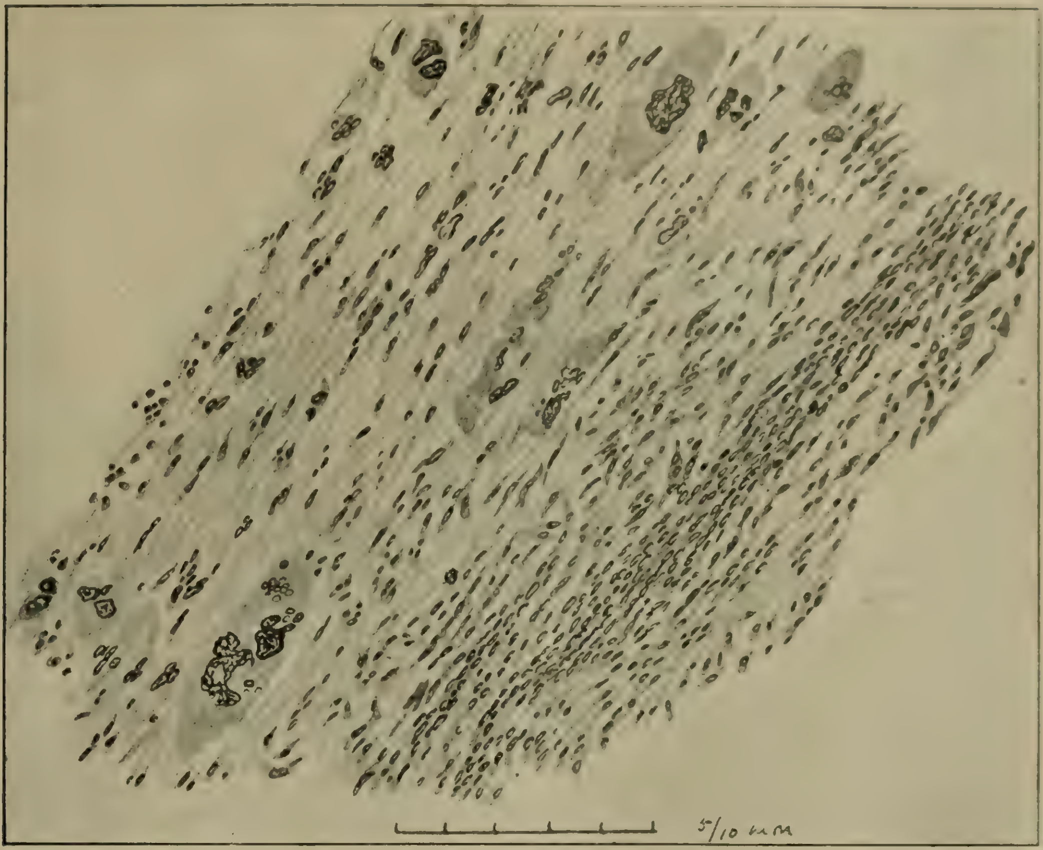

FIG. 10 (Case III).

High-power view of area A, fig. 9, showing giant cells and a strand of closely packed spindle cells.

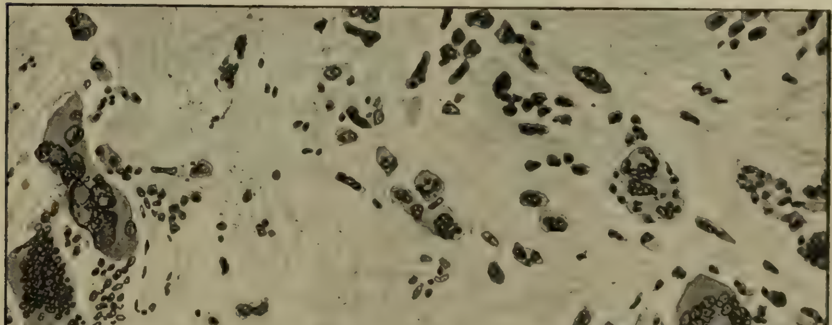

FIG. 11 (Case III).

High-power view of area B, fig. 9, showing epithelial giant cells.

surrounded by sarcomatous cells, towards the middle of this polyp, adds an interesting complication (fig. 9 [C], fig. 10). The polypi possess an imperfect covering of epithelium derived from the adjacent mucous membrane. It is absent over large areas and even when present is often atypical in structure. Its cells are usually columnar in form, and may be arranged in a single layer, but in many places they have undergone a polypoid hyperplasia, and not infrequently they show a tendency to revert to a squamous type (fig. 9 [D], fig. 12).

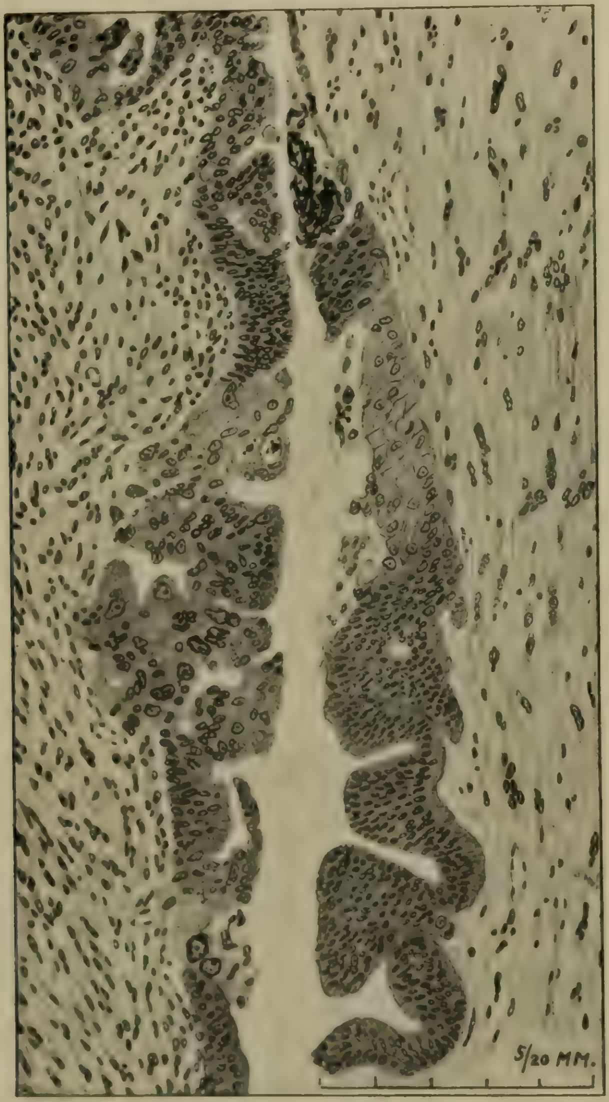

FIG. 12 (Case III).

Drawing of area D, fig. 9. The columnar cells of the covering epithelium are assuming a squamous form in several places, with definite keratinization above and to the right of the figure, spindle-celled stroma to the left, and giant cells to the right.

I have referred to the islands of squamous epithelium which grow in the substance of the polyp. They are derived from downgrowths of the metaplastic surface epithelium, and are atypical in that prickle cells are not formed. Horny degeneration, however, is well marked, and in some places is extreme, resulting in the formation of small masses of keratin which lie free in the stroma, or are surrounded by syncytial masses of protoplasm. These epithelial masses show a remarkable tendency to polymorphism in two main directions: (*a*) The cells, instead of undergoing keratinization, become enormously enlarged, with great proliferation of their nuclei, resulting in the formation of giant cells (fig. 11). This change occurs particularly in areas where the stroma is hyaline. (*b*) The peripheral cells of the epithelial masses become spindle shaped, and break away one from another, spreading out into the stroma and assuming a sarcomatous form (fig. 13).

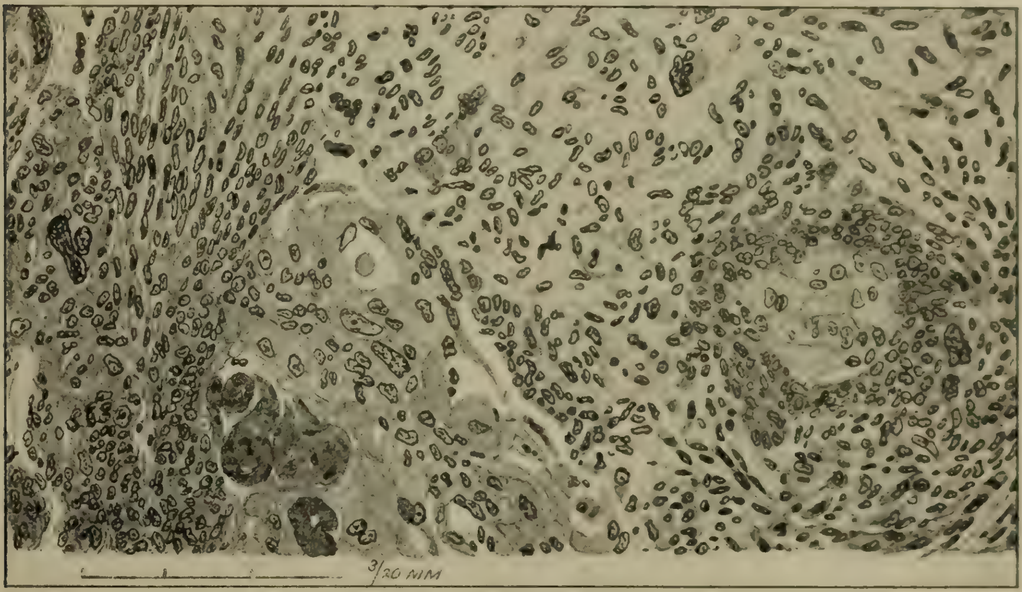

FIG. 13 (Case III).

High-power drawing of area C, fig. 9, showing polymorphism of the peripheral cells of the squamous alveoli. Note the spindle and giant-cell forms, and the large atypical nuclei.

Histologically the polypi are malignant and present many interesting features, the most important of them, for my present purpose, being the exhibition of epithelial polymorphism. The metaplasia of the columnar epithelium into squamous is obvious, and I believe it is also justifiable to regard the giant and spindle-celled elements of the stroma as derived from the infiltrating masses of squamous epithelium by a process of polymorphic growth of these cells.

CASE IV.—PATHOLOGICAL REGISTER, ST. MARY'S HOSPITAL, 923, 1915; POST-MORTEM REPORTS, No. 150, 1915.

Adenocarcinoma of the Prostate with Metaplasia in Squamous-celled Carcinoma, associated with Sarcomatous Stroma.—This tumour occurred in a man, aged 62, who was admitted into St. Mary's Hospital in November, 1915, under the care of Mr. Clayton Greene. An attempt at excision was made, but infiltration was too far advanced, and only a few fragments of the tumour could be removed from the interior of the bladder into which they projected. The patient died a fortnight later, and at the post-mortem an extensive growth of the prostate was revealed. The iliac and the lumbar glands were invaded, and there were many secondary nodules in the liver.

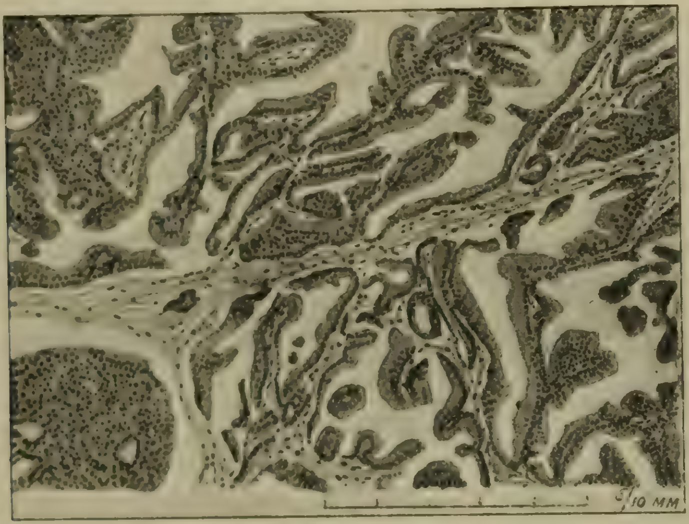

FIG. 14 (Case IV).

Metastasis in an iliac gland; the growth has the structure of an adenocarcinoma.

The microscopic examination of the material obtained at the post-mortem shows an adenocarcinoma of the prostate gland, composed of irregular acini of columnar cells lying in a fairly abundant fibrous stroma. There are no unusual features to be noted. The site of the operation was so infected that microscopic preparations from it were useless, and the examination was confined to the deeper portions of the tumour. An iliac gland is filled with new growth having the general characters of an adenocarcinoma, though it varies in different parts (fig. 14). In places the cells are grouped in large alveoli which contain occasional acini; elsewhere the structure is that of a malignant papilliferous cyst-adenoma, and there are areas where the cells have undergone a considerable degree of necrosis. In the liver the metastases are frequently necrotic, and the growth is no longer pure, for metaplasia of the adenocarcinoma into squamous epithelium has occurred (fig. 15). Prickle cells are not well formed, but keratinization is often very extensive. The stroma, especially in the centre of the nodules, is abundant and dense. The most interesting sections are those obtained from the small fragments removed at the operation, for in these the histological picture is extraordinarily complicated. In some of them the epithelial growth is pure adenocarcinoma, in others it is pure squamous-celled carcinoma, while the transition of the one into the other is well shown in a third series (fig. 16). In respect of its

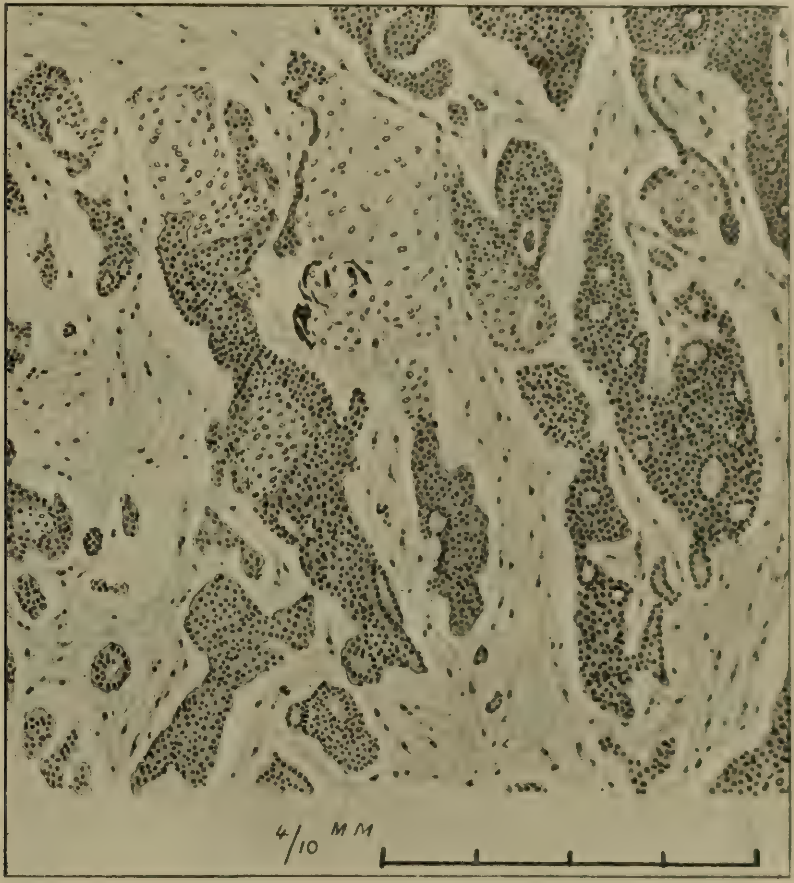

FIG. 15 (Case IV).

Drawing of metastatic deposit in the liver. Squamous-celled metaplasia of the adenocarcinoma.

epithelial structure, therefore, the primary tumour falls into line with its metastases. In all the fragments the stroma is exceedingly myxomatous. In places it is almost acellular, but these areas are small, and for the most part it is thickly studded with highly atypical cells, the histology being that of a polymorphic-celled myxosarcoma. The general structure of the stroma is well seen in fig. 16. The cells may be isolated, with single nuclei and branching protoplasmic processes, or they may be spindle-shaped and arranged in bundles, or they may have a rounded irregular form and be grouped fairly closely together. Variations in size are well marked, and many of the cells contain mitotic figures, usually atypical. Large multinucleated giant cells occur (fig. 17), but although in any one section these appear to be distinct entities, if traced through a series it is seen that they frequently become continuous with each other; they are, in fact, lobed plasmodial masses. Some of the cells contain large or small globules, apparently a form of degeneration; they stain pink with eosin, yellowish brown with van Gieson, and retain Gram's stain. A further complication is the presence of small areas of degenerated carcinoma cells, in some cases consisting of nothing but keratin.

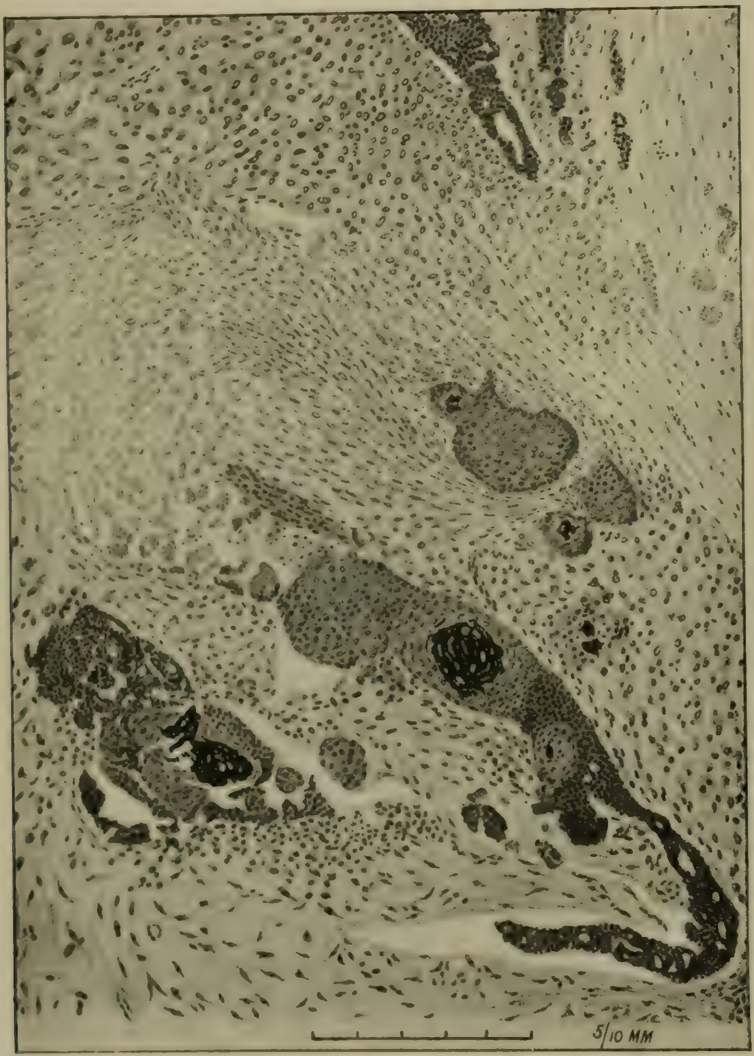

Fig. 16 (Case IV).

Section of the growth removed at the operation. There is direct transformation of the glandular carcinoma into squamous cells, and the stroma is distinctly sarcomatous in structure.

Giant cells are often found in the neighbourhood of these degenerated areas, and though some of these may be of the foreign body type, others, I am convinced, are of epithelial origin.

After a prolonged examination of this tumour I am satisfied that it is yet another example of polymorphism, but in no other case had the practical difficulty of demonstrating this been so great. The epithelial metaplasia is quite obvious, but the transition of the squamous cells into the sarcoma-like elements is by no means so clear. There is never any direct conversion of healthy squamous cells into those of the mesoblastic type, but the change is always gradual. Perfectly typical areas of squamous carcinoma show slight irregularities; then changes become more advanced, though the squamous character of the cells is still certain: finally, these alterations in structure become so extreme that it is no longer possible to say that the cells are epithelial in origin. From these more atypical areas to the definitely "sarcomatous" tissue the change is again gradual. It is quite impracticable to illustrate these various stages, for a couple of dozen figures would be necessary, but I have already drawn attention to certain features which are suggestive. Especially important, I think, are the giant cells, the bundles of spindle cells in association with closely packed spheroidal elements, and the keratinoid degenerations so frequently present. An interesting field is illustrated in fig. 18. At the top of the figure is an island of squamous epithelium, and at the lower margin of this the edges have become frayed out and merge into the stroma, so that it is no longer possible to distinguish their outline. Masses of keratin, seen in other sections to be continuous with the central

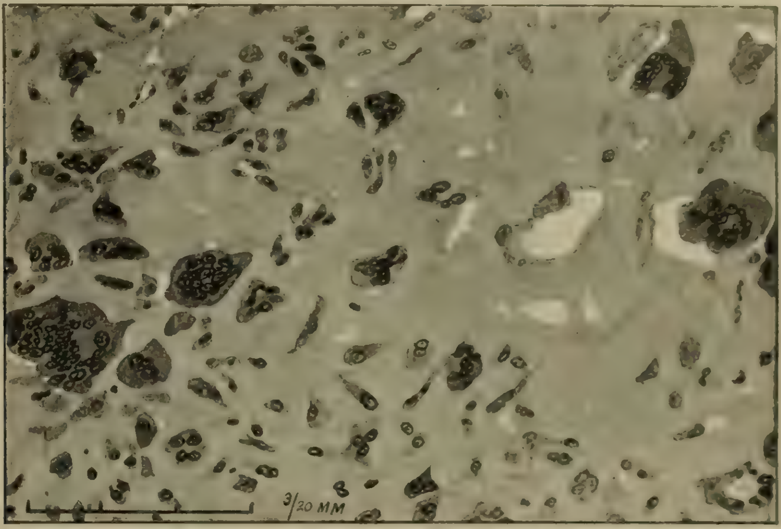

FIG. 17 (Case IV).

Operation material. High power view of a sarcomatous area showing giant cells and myxomatous stroma. Traced in serial sections, these giant cells are seen to join with each other.

keratinization of the epithelial nodule, lie among these cells; and it is quite clear that the squamous epithelium is not only in contact with sarcomatous tissue, but that its peripheral cells have actually become transformed. To the left of this part of the field other epithelial cells have fused to form large syncytia. Traced downwards, the epithelial cells become still more abnormal, till, towards the lower limit of the field, the sarcomatous structure is

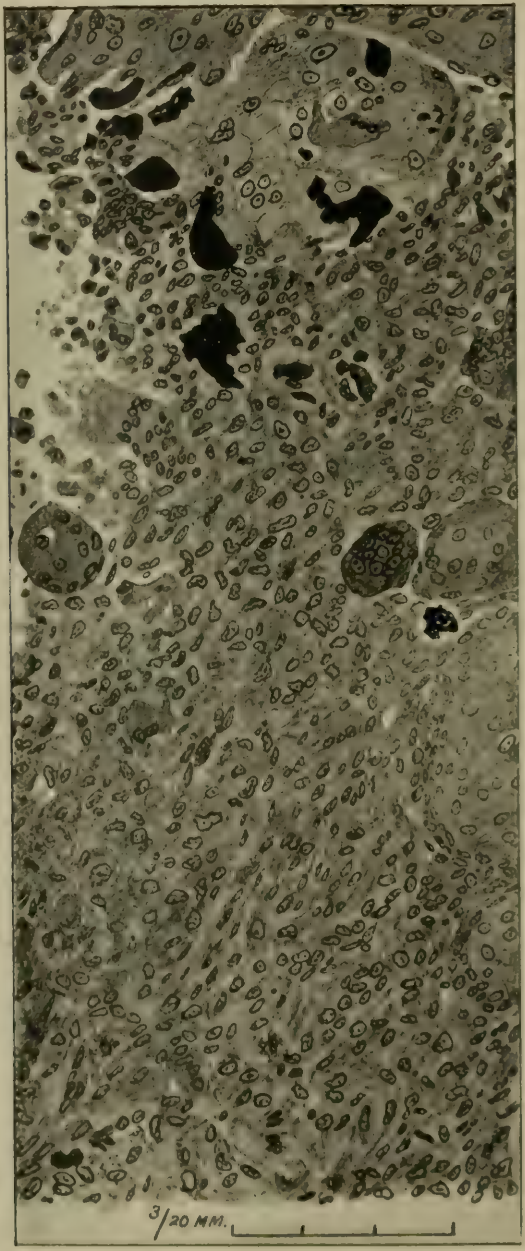

FIG. 18 (Case IV).

Operation material. Showing polymorphic growth of the peripheral cells of an island of squamous epithelium. Masses of keratin and groups of unaltered squamous cells lie in the "sarcomatous" tissue.

approached. This, then, I regard as an example of polymorphism. The glandular cells become squamous, and the squamous cells tend to assume mesoblastic characters. It is interesting to note that a high proliferative activity of the tumour cells and plasticity of the stroma, conditions which Krompecher believed necessary for this change to take place, are both present in this case. In the main part of the growth and in the extreme metastases the stroma is not peculiar. It is only in the small portion which projected into the bladder that there is advanced myxomatous degeneration, and this is the only situation in which the extreme degree of polymorphism is seen.

CASE V.—PATHOLOGICAL REGISTER, ST. MARY'S HOSPITAL, 309, 339, 1912.

Squamous-celled Carcinoma of the Epiglottis in Combination with a Spindle-celled Sarcoma.—I have so far dealt with "Mixed Tumours" which are capable of analysis in spite of their complexity, and have shown that they are really epithelial in origin. It is seldom, however, that such a definite conclusion can be reached from a purely histological study of these neoplasms; usually, as in this case, one can only venture on an opinion. The patient.

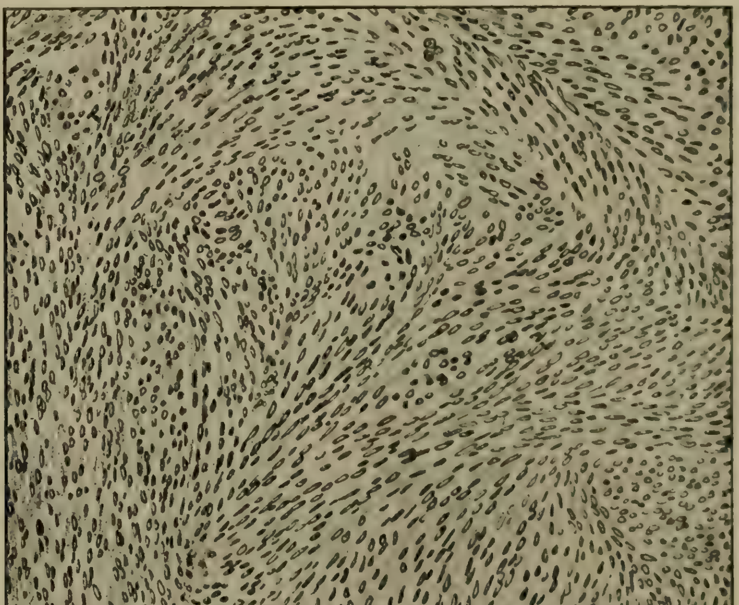

FIG. 19 (Case V).

The growth has the structure of a spindle-celled sarcoma.

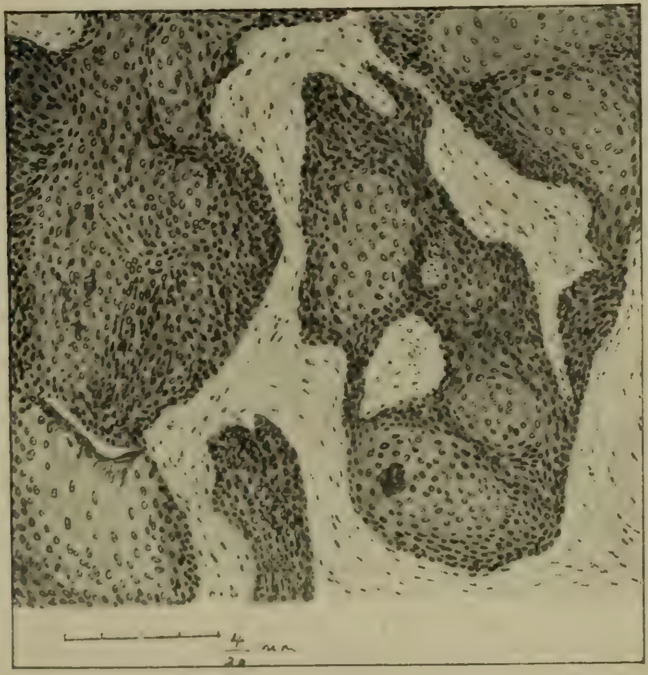

FIG. 20 (Case V).

Another area of the tumour, where the structure is that of a squamous-celled carcinoma.

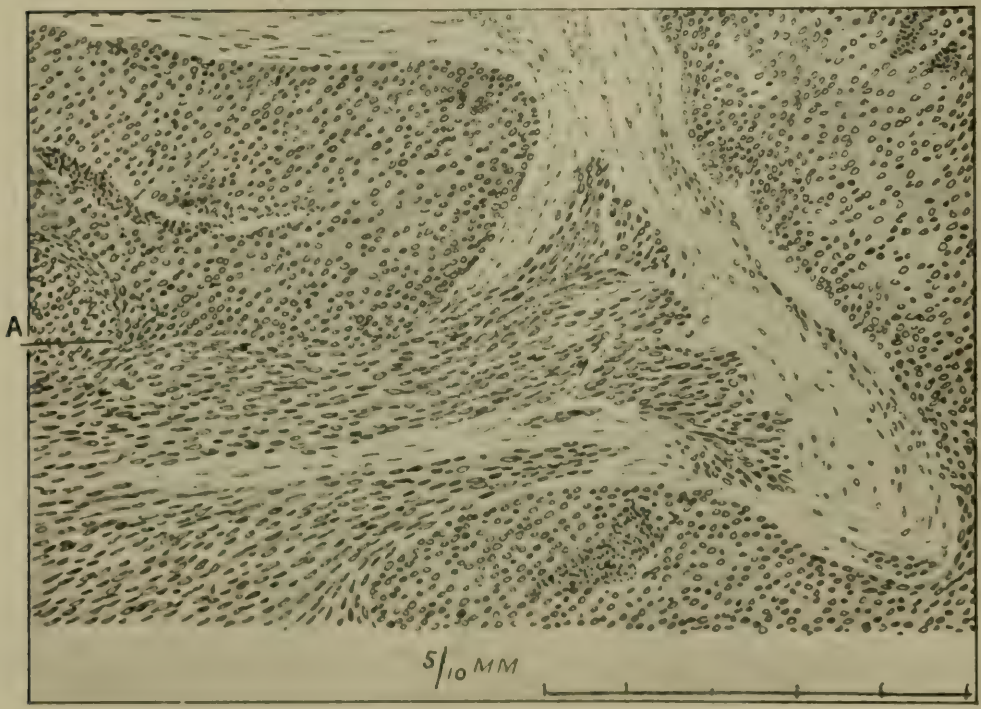

FIG. 21 (Case V).

Illustrating the blending of atypical squamous-celled carcinoma and sarcoma. At A the appearance suggests a direct transition of the carcinoma into the sarcoma.

a man, aged 60, who was under the care of Mr. Cecil Graham, presented a fungating growth of the epiglottis. Complete excision was performed, and the patient made a good recovery, though death occurred some months later from generalized dissemination. Microscopic examination of the tumour reveals the presence of two different types of growth, a spindle-celled sarcoma and a squamous-celled carcinoma. In places they are quite separate, but throughout a large part of the growth they are intermingled so that the ordinary stroma of the carcinoma is replaced by sarcoma.

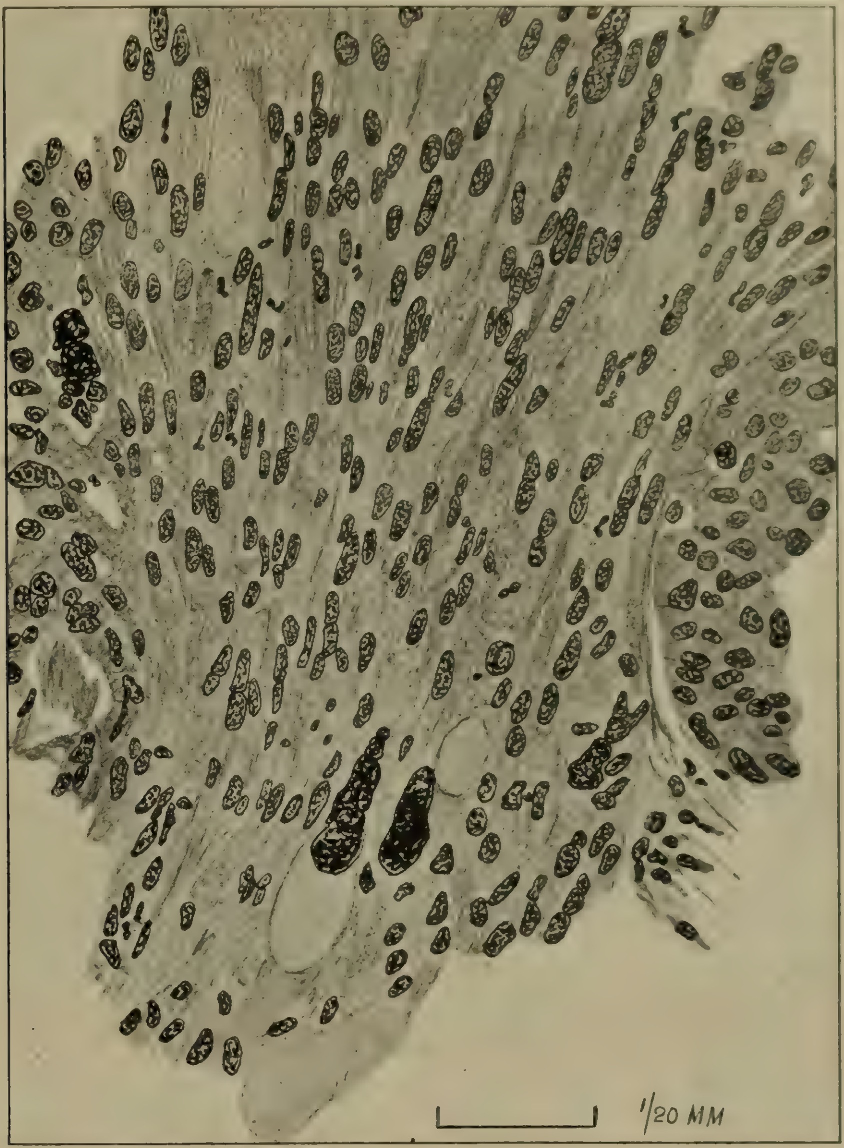

FIG. 22 (Case V).

An alveolus of squamous-celled carcinoma, showing atypical spindle-celled growth with the formation of giant cells.

The sarcoma (fig. 19) is composed of large spindle cells which are arranged in interlacing bundles. Many capillaries are present but there is seldom any collagen to be seen, possibly because the fixative employed contained no mercury, so that special staining methods for demonstrating intercellular substances could not be used. Mitotic figures are numerous, and there are a considerable number of multinucleated giant cells.

The squamous-celled carcinoma, of which the growth mainly consists, is for the most part typical, exhibiting prickle cells and horny degeneration. Its cells are grouped together in large alveoli which lie in an abundant fibrous stroma. There is, however, a distinct tendency to atypical growth. In some places the cell outlines become indistinct, prickle cells are absent, and instead of keratinizing, the central cells undergo complete degeneration, resulting in the formation of spaces containing cell débris and leucocytes. In other situations the cells become elongated and spindle-shaped, and are packed together into bundles (fig. 22). Giant cells are formed containing a large single nucleus or several smaller ones and mitotic figures occur, though they are seldom present elsewhere in the carcinoma. The structure of these alveoli so closely resembles

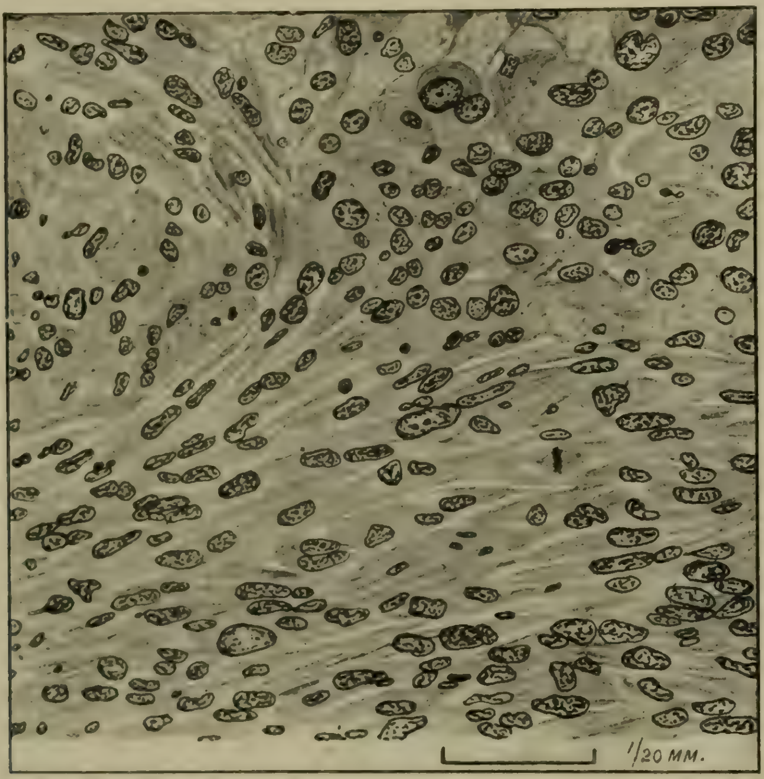

FIG. 23 (Case V).

High-power view of portion A, fig. 21, showing the apparent transition between the carcinoma and the sarcoma. Compare the structure of the sarcoma with that of the carcinoma in fig. 22.

that of the sarcomatous areas that it seems more than likely that they are both merely variations in the growth of the carcinoma cell, but in spite of a prolonged examination of all parts of the tumour, I have not been able to satisfy myself on this point. In some sections there appears to be a loosening and fraying out of the carcinoma cells, and a direct transformation of them into sarcomatous tissue (figs. 21 and 23). But I cannot be certain that this is what has actually occurred; and though both the neoplasms are in places highly atypical, tending to revert to a common type, I am unable to determine whether the tumour as a whole should be regarded as an example of epithelial polymorphism, or whether the carcinoma and sarcoma are distinct growths.

CASE VI.—PATHOLOGICAL REGISTER, ST. MARY'S HOSPITAL, 274, 191[illegible].

Squamous-celled Carcinoma of the Skin associated with a Melanotic Sarcoma.—In the preceding cases I have tried to show that what appear to be highly complex neoplasms are susceptible of a much simpler explanation, if due allowance is made for the unstable morphology of the malignant epithelial cell. The following tumour falls into a different category, for by recognizing the epithelial nature of an apparently sarcomatous cell, an alternative and more complicated explanation is afforded of a growth which might easily have been dismissed as a melanotic sarcoma. The tumour was removed by Mr. Warren Low from the palm of the hand of a woman aged 75. It had been growing for nine months. On section it was seen to be composed of a soft fleshy substance in which a few connective tissue trabeculæ could be distinguished:

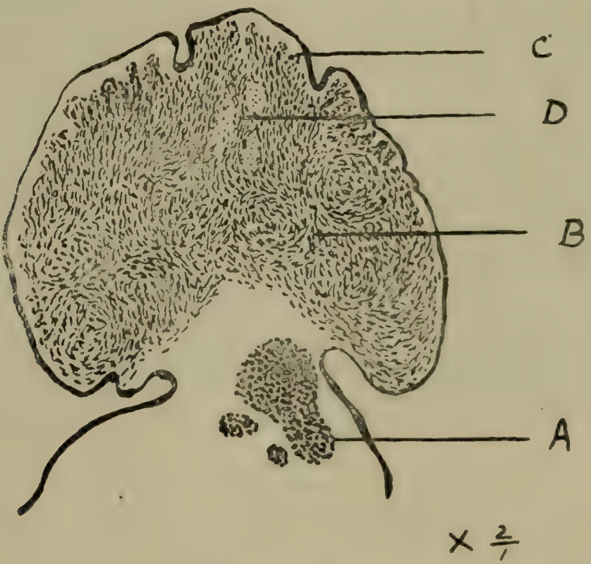

FIG. 24 (Case VI).

Diagrammatic drawing of tumour; A, melanoma; B, spindle-celled epithelioma; C, superficial carcinomatous areas; D, sebaceous areas.

at the base of it there was a small, pigmented, lobulated growth which appeared to be quite distinct from the main tumour (fig. 24).

To take the small tumour first, this is a typical melanotic sarcoma (fig. 25). It is composed of interlacing bundles of large spindle cells, very rich in melanin. The pigment is not limited to the cells, for it also occurs in masses in the fibrous tissue trabeculæ which separate the cell bundles. In places the cells lose their spindle shape and assume an irregularly polygonal form, a change which is associated with loss of pigment.

The larger tumour has a different structure, though at first glance it also appears to be a sarcoma. It is composed of spindle-cells, with large elongated nuclei, arranged in massive bundles which lie in different planes and frequently interlace (fig. 26). Mitotic figures occur, but are not common. A few strands of connective tissue, rich in mononuclear leucocytes, traverse the growth and split it up into lobules: but no interstitial connective tissue can be demonstrated. There is a complete absence of pigment throughout the whole tumour, and although this is not incompatible with its being a part of the melanoma, a closer examination gives unmistakable evidence of its epithelial nature. On the superficial aspect, immediately beneath the covering epithelium, which is thin though intact, the cells become spheroidal in shape and grouped in solid alveoli with much intervening stroma; they assume, in fact, a carcinomatous arrangement, though there is nothing suggestive of any particular type of epithelium (fig. 27). A certain degree of differentiation is seen, however, in the centre of the growth, for there occur here groups of polygonal cells with a foamy cytoplasm, and single, rather small nuclei, which resemble very closely

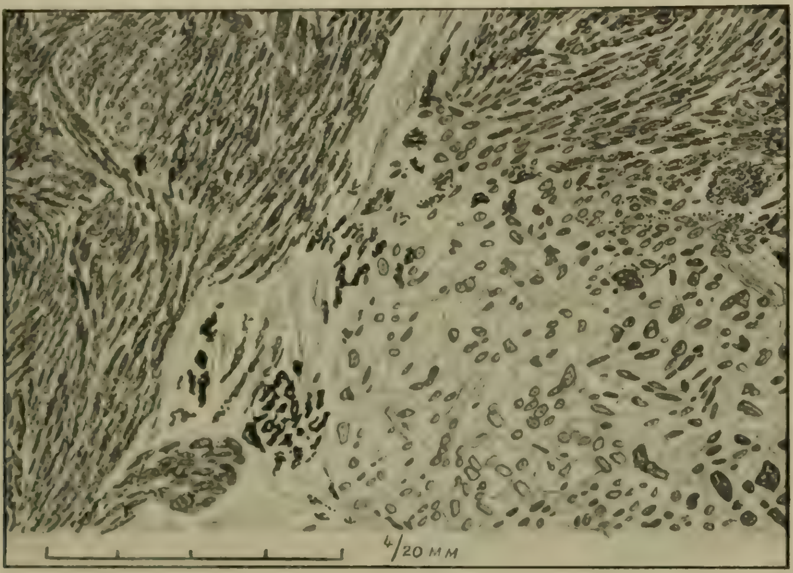

FIG. 25 (Case VI).

Melanoma showing bundles of pigmented spindle-cells and alveoli of polygonal cells.

the cells of a sebaceous gland, though they contain no fat (fig. 28). The only other possibility is that they are wandering macrophages, but this is negatived by the fact that their development by the transformation of the spindle cells of the tumour can be traced with certainty.

We have, then, two distinct neoplasms in juxtaposition, a polymorphic squamous-celled carcinoma and a melanoma, and the question of their interdependence immediately arises. It is generally agreed that melanomata develop from chromatophores, but opinion is still divided as to the origin of the latter, some regarding them as epiblastic derivatives while others refer them to the mesoblast. A study of the melanomata themselves does not help to decide the point, for though two distinct varieties, the carcinomatous and the sarcomatous, occur, they tend to approximate to one type and are not really separable. So far as it is possible to draw any conclusions from histology, I am more inclined to place them among the carcinomata, because an epithelial tumour is capable of growing as a sarcoma, but I know of no instance in which the reverse occurs. This case would seem to lend support to the epithelial view; there is but little difference in structure between the two growths except the presence or absence of melanin, and it might be argued that the tumour as a whole shows the stages in the development of the melanoma from the epithelioma. This argument is only valid, however, on the assumption that all true epitheliomata conform to type; if it can be proved that the epithelial cell may, under varying conditions, give rise to a tumour having a sarcomatous structure, it becomes impossible to attribute any significance to a particular example of this condition.

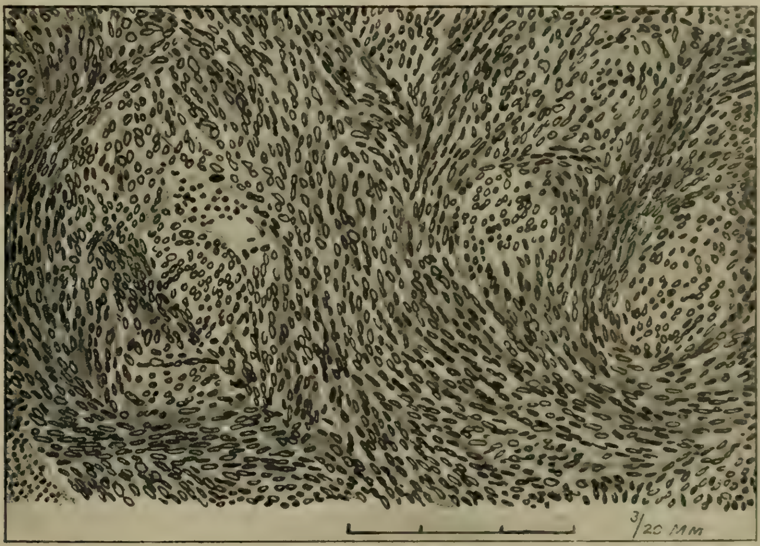

FIG. 26 (Case VI).

Higher magnification of B, fig. 24, showing spindle-celled sarcomatous structure.

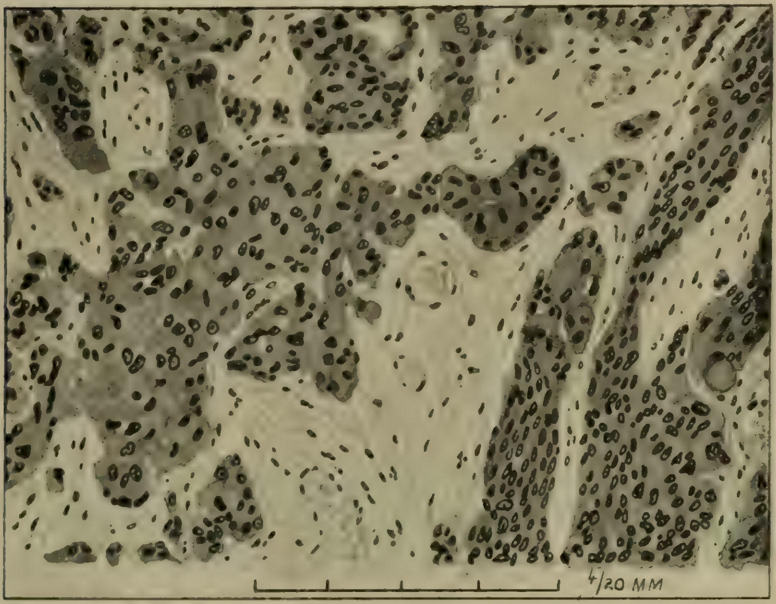

FIG. 27 (Case VI).

Area C, fig. 24. The structure is that of an undifferentiated carcinoma.

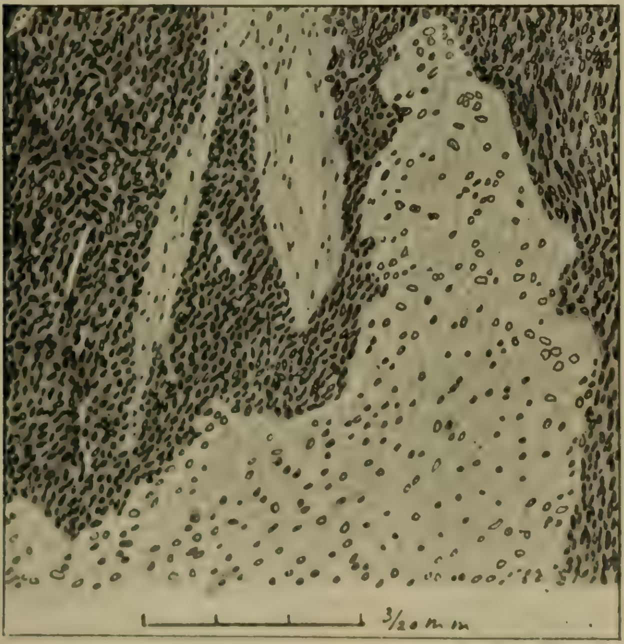

FIG. 28 (Case VI).

Area D, fig. 24, showing transformation of spindle cells into large clear cells of the sebaceous type.

Lacking evidence to the contrary, we must regard these two neoplasms as quite separate: the polymorphism of the epithelioma is within the known potentialities of the malignant epithelial cell, and there is really nothing to show that the association of the tumours is more than a coincidence.

In describing these tumours I have purposely been as brief as possible and have confined myself strictly to one field of inquiry. All the tumours are interesting in themselves, but I have brought them forward merely to illustrate my subject, not as individual cases; and I have refrained from obscuring the main issue by a discussion of subsidiary matters. In the first four the changes in the epithelial cells can be traced from their inception, and all stages in the development of the sarcomatous form can be followed with comparative ease. These tumours, however, are exceptional; the majority of carcino-sarcomata are incapable of analysis by histological methods alone, as is shown in Case V. Case VI illustrates another aspect of the question. At first sight, the association of an unusual type of epithelioma with a melanoma would seem to throw light on the origin of the latter; but if the possibilities of epithelial polymorphism are borne in mind, it becomes obvious that there is no justification for drawing any conclusions as to the derivation of this particular melanoma from squamous epithelium.

I wish to make it clear that I do not assert an actual physiological transformation of the epithelial cell; but I submit that it may undergo such alterations as to become morphologically indistinguishable from the connective tissue cell.

I have no theory as to why this change should take place. In some of my tumours there is evidence of a heightened activity of the cell, and the stroma is unusually hyaline or myxomatous. These conditions, however, occur in tumours showing none of the structural variations which I have described, and I cannot regard them as the sole, or even the most important factors.

The explanation is probably much more complex and demands a much deeper knowledge than we at present possess; but the recognition of the extraordinary powers of polymorphic growth of the malignant epithelial cell is, I hold, of the greatest importance in the histological study of malignant disease.

REFERENCES.

[1] NICHOLSON, G. W. "Three Cases of Squamous-celled Carcinoma of the Gall Bladder," *Journ. Path. and Bact.*, 1908-9, xiii, p. 41.

[2] MURRAY, J. A. "A Transplantable Squamous-celled Carcinoma of the Mouse," Third Scientific Report, Imperial Cancer Research Fund, Lond., 1908, p. 159.

[3] KROMPECHER, E. "Uber die Beziehungen zwischen Epithel in Bindegewebe bei den Mischgeschwülsten" [&c.], *Beitr. z. path. Anat. u. z. allg. Path.*, 1908, xliv, p. 88.

[4] Fourth Scientific Report, Imperial Cancer Research Fund, Lond., 1911, p. 147.

[5] FISCHER-DEFOY und LUBARSCH. "Multiplizität der Karzinome," &c., *Ergebnisse der allg. Path.* (Lubarsch und Ostertag), 1904-5, x, p. 924.

[6] MAJOR, R. H. "Multiple primary malignant tumours," *Johns Hopkins Hosp. Bull.*, 1918, xxix, p. 223.

[7] EHRLICH und APOLANT. *Berl. klin. Wochenschr.*, 1905, xlii, p. 873.

[8] HAALAND, M. Third Scientific Report, Imperial Cancer Research Fund, Lond., 1908, p. 175.

[9] RUSSELL, B. R. G. *Journ. Path. and Bact.*, 1910, xiv, p. 344.

[10] TAYLOR and TEACHER. *Journ. Path. and Bact.*, 1909, xiv, p. 205.

[11] STAHR. *Centralbl. f. allg. Path.*, 1910, xxi, p. 108.

[12] HERXHEIMER, G. "Das Carcinoma Sarcomatodes," *Beitr. z. path. Anat.*, 1908, xliv, p. 150.

[13] SALTYKOW, S. *Centralbl. f. allg. Path.*, 1914, xxv, p. 419.

[14] WELLS, H. G. "Multiple Primary Malignant Tumours," *Journ. Path. and Bact.*, 1901, vii, p. 357.

[15] SCHLAGENHAUFER. "Carc. u. Riesenzellsarkom derselben Mamma," *Centralbl. f. allg. Path.*, 1906, xvii, p. 385.

Section of Pathology.

President—Dr. W. BULLOCH, F.R.S.

The Conveyance of the Virus of a Human Acute Infective Polio-encephalo-myelitis occurring in Australia to Monkeys, Sheep, a Calf and a Foal.[1]

By J. BURTON CLELAND, M.D.

IN February, March and April, 1917, and again in January, February, March, and the beginning of April, 1918, a number of cases of an acute polio-encephalo-myelitis occurred in New South Wales. Records have been obtained of over 130 of these cases, of which 70 per cent. were fatal. The disease was confined almost entirely to the dry, hot, western portion of the State. It was also recorded in 1917 from the adjacent portion of Queensland, and Brisbane and Townsville in that State. In 1918 cases occurred in the Goulburn Valley in Victoria. The disease seemed to a very great extent to be limited by climatic conditions, and showed a marked preference for the late summer and autumn months.

All ages were affected, some of the patients being only a few months old and others over 60 years of age. Convulsions, coma, and rigidity of the neck, limbs or back were frequent; paralysis and paresis, though occurring, were rare, and strabismus and oculo-motor signs were occasionally present. Some patients showed mental symptoms. The temperature was high, and hyperpyrexia, reaching as high as 110° F. an hour before death was seen in some cases near the fatal termination. The cerebro-spinal fluid was sometimes increased and always clear and waterlike. In several of the cases that recovered permanent paralysis remained, whilst three showed mental disorder, which later improved or cleared up. The majority of the patients that recovered, however, showed no aftermath.

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[1] At a meeting of the Section, held April 15, 1919.

During the prevalence of this disease, in the districts affected and throughout the State, there was no increase of cases of ordinary acute poliomyelitis (infantile paralysis)—a disease notifiable under the Public Health Act—as recognized by the general practitioner. In fact, in some of the affected parts there were no notifications of ordinary infantile paralysis whatsoever, in spite of a number of cases of encephalitis occurring.

In 1918 the disease was successfully conveyed to monkeys, *Macacus rhesus*, by materials from the brain and spinal cord of three human cases. The material was preserved in glycerine and injected intracerebrally. The strain obtained from one of these human cases was passed through a series of monkeys to sheep, a calf and a horse. The monkeys successfully inoculated by the various strains were twenty in number and the sheep from the one strain thirteen. Histological examinations of the brain and spinal cord from a number of cases of the human disease, as well as from the twenty monkeys and thirteen sheep, the calf and the horse, all showed essentially the same lesions. Congestion of the brain was a marked feature. Many of the veins in the central nervous system and the pia mater were sheathed with lymphocyte-like cells. Though present to a considerable degree in nearly all the human and animal cases, this condition was not uniformly distributed throughout the central nervous system in any individual animal, some parts escaping in one case to be affected in another. The internal capsule, pons and medulla were most commonly and distinctly affected; the white matter did not always escape. In most of the sheep the sheathing of the veins was exceedingly marked. In addition cellular accumulations or islands of small cells with rounded or irregular nuclei were frequent in the grey matter, especially that of the pons, medulla and cornua of the spinal cord. These were often traceable to the neighbourhood of small vessels. Nerve cells in process of destruction and surrounded by similar cells were occasionally seen. Their destruction appeared to be secondary to the cell accumulations and to interference with the vascular supply, rather than primary.[1]

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[1] Neither in the human cases on which we made post-mortem examinations, nor in the various animals to whom the disease was conveyed, was any evidence obtained that the disease was due to an ordinary bacterial infection. Though Pasteur-Chamberland F filtrates of infective material failed in monkeys and Berkefeld filtrates in sheep, it is possible that repetitions of these may sometimes be successful. The epidemiology, the histological findings and the successful conveyance to the animals indicated, all suggest that a virus, very closely allied to, and possibly merely a mutant of, that responsible for acute poliomyelitis, is the cause of the disease. To what class of living organisms such viruses belong is at present mere speculation.

THE DISEASE AS MANIFESTED IN THE MONKEY, MACACUS RHESUS.

Of the twenty successful transmissions to these monkeys, five were obtained directly from three human cases, two from a sheep successfully inoculated from monkeys, and the remainder from monkeys. Successful transmission was not obtained by intraperitoneal or intrasciatic inoculations nor by intracerebral inoculation of cerebro-spinal fluid from human cases. The incubation period varied from five to twenty-three days, being usually from five to twelve days. In half of the monkeys the first symptom noticed was an anxious expression of the countenance; this was followed by exaggerated muscular movements, the animal being described as "nervous," "jumpy," "walking gingerly," or showing inco-ordination. The inco-ordination frequently became pronounced, the animal, whilst moving about or trying to jump, swaying from side to side and tumbling over and frequently hurting itself against the sides of the cage. This inco-ordination of a type, due in almost all instances to an exaggeration of muscular efforts rather than paresis (which was present in some instances), was a predominant feature of the disease in the monkey, being shown by nineteen out of the twenty animals infected. On the other hand, paresis or paralysis of a limb or limbs, though present during the course of illness in fifteen animals, was not such an outstanding and constant feature, being slight in three, pronounced in eight, and considered as a definite paralysis in four. Even in marked cases some tone was nearly always left in the muscles, so that the limb when raised rarely fell in a flail-like fashion. Squint was noticed in two animals, and ptosis in three, being marked in two of these. Other symptoms noticed were definite convulsions, but apparently without loss of consciousness, in three cases. These were apt to be brought on by disturbing the animal. A general trembling as in paralysis agitans, or trembling only of the limbs and head, was noticed in two cases; five of the animals uttered staccato or barking cries; in several there was spasticity; and three were drowsy, somnolent or intensely sleepy. Finally, after an illness usually lasting from two and a half to six days, but in one instance eight days and in another eleven days, the animal either died or was *in extremis*, and therefore killed. In one animal an improvement had occurred at the time it was killed, which suggested that it might have recovered or lived considerably longer. It is probable also that amongst the other animals the illness might have been prolonged for a day or so if chloroform had not been administered. In thirteen of these cases, usually instances in which the inco-ordination had been great, there was final prostration, the animal lying on the bottom of the cage and showing frequent convulsive movements of the limbs when disturbed, though these were occasionally absent when the animal appeared as if almost dead.

The following is a summary of a typical case in a monkey, especially chosen as being an animal successfully inoculated from a positive sheep:—

A 62, *Monkey* 3845.—On the fifth day after inoculation it appeared to show slight inco-ordination. Next day its movements were distinctly ataxic and there appeared to be some weakness in one arm and leg. On the third day of illness it swayed on movement, but the apparent weakness of the arm and leg was lost. On the fourth day it was much the same. On the fifth day the hind limb seemed paretic and movements were very shaky, jumpy and inco-ordinate. The animal fell from time to time on the bottom of the cage and showed violent inco-ordinated movements, almost convulsive in character. The animal was killed with chloroform.

THE DISEASE AS MANIFESTED IN SHEEP.

Thirteen successful inoculations, confirmed by full histological examinations, have been obtained in sheep. In ten of these the virus was obtained from monkeys, and in the remaining three from previously inoculated sheep. As a converse to the conveyance of the disease from the monkey to sheep, the virus was conveyed from the sheep to two monkeys, and from one of these to a series of these animals. All the inoculations were intracerebral under an anæsthetic, and the virus was suspended either in 33 per cent. glycerine or in normal saline solution. The inoculations were all made within two days of the death of the previously infected host of the virus. After an incubation period of three to twelve days the first symptoms of illness were noticed. The duration of the illness, until the animal died, or was *in extremis* and killed, ranged from one to five (or seven) days, except in one case in which the animal died thirty days after symptoms were first noticed. The early symptoms were somewhat vague, as might be expected in an animal showing such few mental characteristics as the domesticated sheep. They consisted in the animal not feeding and in its keeping its head dependent. During the course of illness convulsive movements or fits—sometimes intense, during which the head was drawn back and the limbs "worked," were noticed in eleven cases. In five the animal tended to walk in circles. Quivering or fine tremors of the lips, ears or nostrils, sometimes extending to the whole body, occurred in nine sheep; "champing" movements of the jaws or grinding of the teeth occurred in three; rapid or very irregular breathing was noticed, especially in association with convulsive movements, in nine animals. Amongst other symptoms occurring may be mentioned stiffness of the neck, or retraction of the head in six; some rigidity of the legs or stiffness in the gait in two; "staggers" in one; restlessness in one; drowsiness in one; weakness in the hind legs in one; running from the nose or a mucous discharge from the nose in two; and dribbling from the mouth in two. One animal became unconscious on the third day. Whilst the animal was undisturbed none of these symptoms, except the disinclination to eat and the dependence of the head, might be observed, unless, of course, convulsive seizures had developed. One animal, not included in the above series of proved successful inoculations, actually recovered after having had mild convulsions. Several other sheep also recovered after showing slight symptoms suggesting that they had suffered from the disease. The final stage was sometimes rapid, and in one case took place in an hour. Details respecting this animal are briefly as follows :—

In the morning it was moving about and eating a little. In the afternoon it was seen in the paddock turning round slowly in a circle, with its head down as if trying to reach the grass. After making several revolutions it fell over on its side and began nibbling, not grass but a small native plant (*Pimelea*) of unattractive appearance. Shortly afterwards its head became retracted and there were slight convulsive movements, whilst the lips and nostrils were trembling and moving irregularly. It was breathing quickly and there were occasional to and fro movements of the forelimbs, less so of the hind limbs. Later the head became distinctly retracted and the limbs rather rigid and partly convulsed. The segments of the hoof of one of the front feet were sometimes widely separated. The animal seemed to be unconscious. More definite convulsive movements occurred occasionally. At the end of one of these, respirations became highly irregular and then ceased, and the animal died an hour after it had first been noticed circling round.

A striking feature in connexion with inoculations made into sheep has been that in a series of animals inoculated on the same day, in the same way and with the same material, some have developed the disease, some have apparently failed completely to do so, and some have manifested very slight evanescent signs possibly indicating a mild form of the disease. In several instances repeated inoculations with material, known by the results of inoculations into other sheep to contain the virus, have failed. In one instance in which four inoculations were made into one sheep, the material used in three of these was known to have contained the virus at the time of the inoculation as shown by its giving positive results in other animals, and yet this sheep remained unaffected.

These results seem to show that in the sheep, while some individuals are susceptible to the disease when the virus is actually introduced into the brain, others are absolutely immune to it, whilst perhaps still others may develop a very mild form of the disease. The results of the repeated inoculations with virulent material show that the failure in the first instance has not been due to some fortuitous circumstance which has not been recognized, but was actually due to insusceptibility (natural immunity).

It may here be pointed out that more than the mere presence of a minute living parasitic organism is necessary in an animal host to produce disease. In addition, a reaction on the part of the host to the presence of the parasite or to its products may be necessary. If the cells of the host do not react to the presence of the parasite or its products, the parasite, if small, may live commensally in the host without doing any damage. If the irritation caused be slight, the reaction by the cells of the host may be so slight as to give rise to no clinical symptoms, whilst immune bodies may in other cases be produced sufficiently rapidly to annul the reaction at an early stage. The results in sheep seem to suggest that the reaction of the cells of the sheep to the presence of the virus or its products approaches this border line. In some individuals the reaction to the virus is so slight, or occurs in such situations, that clinical symptoms do not appear, or are very slight. In other individuals the protective mechanism is less effective and the reaction progresses to such a stage in certain situations as to lead to death. In this may lie the explanation of the haphazard incidence of ordinary acute poliomyelitis as well as of this disease in human beings.

THE DISEASE AS MANIFESTED IN THE CALF.

Calf 3,848B received an intracerebral injection on April 25 of a glycerine emulsion from the third generation of the disease in the monkey. The details respecting the experiment in this animal are as follows:

The animal remained well till April 30, when it was noticed that it kept its head down towards the ground; if allowed to stand quietly it seemed inclined to "go" slightly in the front legs, and then to get restless. There was no sign of paresis. The animal was "right off its food" and there was regurgitation of milk, this possibly indicating some paresis. At 6 a.m. it had been noticed to be trembling all over (the morning was cool). On May 1 there was a clear discharge from the nostrils; no food was taken. On May 2, when seen at 2.45 p.m., it was lying on its right side with the head distinctly retracted and the back arched. It was doubtfully unconscious. The abdomen was moderately distended; respirations were rapid and shallow; there were convulsive spasms, and there were rigidity of the limbs and muscular tremors. The exposed eye was rolled downwards disclosing the white. General convulsive seizures occurred every few minutes. The symptoms changed after about twenty minutes, when the animal became fairly quiet and respirations were slower and deeper. An hour earlier the animal was said to have been walking about, but the legs were then weak and the gait was circular, and towards the right side. The animal died at 4 p.m.

A histological examination showed the presence of the perivascular cellular sheaths already described from other animals. These were not so pronounced as was usually the case in sheep.

THE DISEASE AS MANIFESTED IN THE HORSE.

Horse 3,908, a yearling animal, received an intracerebral injection from the eighth generation of the virus from monkey 3,890 on June 28. The first four generations had developed in monkeys, the fifth in a sheep, and the last three again in monkeys.

We are indebted to Professor Stewart of the Veterinary School, University of Sydney, for performing the operation for us and for notes of the illness that resulted. The following are the details:—

The animal recovered well from the operation and showed no symptoms of disease, beyond slight variations of temperature, up to July 7. On the afternoon of this day it was taken with two "seizures," during which it walked round towards the left. On July 8 it was holding its head down and "shivered" twice during the morning (it had done so once the day before). In the afternoon it was standing with its head depressed, and when made to move moved to the left side and threatened to fall towards this side. It showed slight excitement on movement, with twitching of the facial muscles, a staring eye, and apparently partial blindness. It staggered somewhat on moving. The respirations were hurried and abdominal. Temperature, 103·8° F. On July 9 the animal was worse. At 12.30 p.m. it was lying on its right side and could not eat nor swallow. It was apparently more or less blind and took no notice of food or drink. Its head was drawn towards the left side and there were irregular movements of the left fore and hind limbs. It kicked more vigorously with its left legs than with the right ones. It could not get up, but sometimes raised itself halfway. The nostrils were working and the mouth drawn at times to the left side. The ears and eyebrows, especially on the left side, were twitching. It was grinding its teeth. When turned on to its left side it was found that the head was not now arched to the right, but during apparent convulsive seizures the neck was arched still to the left and the head burrowed more into the ground. By 1.45 p.m. the animal was in intense and repeated convulsions, having dug a hole in the ground with its head. These convulsions alternated with short quiescent periods ; then would follow occasional rigidity and tremor of a limb, to be followed by further convulsions. The animal was killed at 2.30 p.m.

At the post-mortem examination an area, about ½ in. in diameter, of blood clot and degenerated tissue was found in the brain. Histological examination showed the presence of the perivenous cellular sheaths noticed in other animals. These were slight in the spinal cord but more pronounced in portions of the brain, though not so extensive as the sheaths found in sheep.

COMMENTS ON THE INOCULATIONS.

A considerable amount of material, usually about 1 c.c., was used for the intracerebral inoculations. The introduction of so much foreign matter naturally led frequently to lesions at the site of inoculation. When a lesion existed, it sometimes consisted of blood clot with degenerated brain tissue, sometimes of a small cavity with ragged walls. Smears and cultures made from these areas did not reveal the presence of any bacterial organism responsible for them. Pus cells were rarely detected in the areas. Microscopic sections showed blood clot and large vacuolated reactionary cells in the wall. In other animals no macroscopic lesion could be detected at the site of inoculation. The lengths of the incubation periods, the post-mortem examinations, and the results of smears, cultures and sections of the inoculated sites when present, showed that there was no bacterial contamination which could be held responsible for the conditions found. The incubation period of varying extent, sometimes long, showed that the symptoms manifested were not due merely to the inoculation of inert material into the brain, as signs under these circumstances should have developed forthwith.

The inoculation of successful cases was made with material taken from the brain and spinal cord not in the immediate vicinity of the inoculation site when present. The virus must therefore have emigrated from the site of inoculation into other parts of the central nervous system.

SUMMARY.

(1) Over 130 cases of a form of polio-encephalo-myelitis occurred in man in the western parts of New South Wales in the late summer and autumn of 1917 and 1918; 70 per cent. of the cases were fatal;

the outstanding features were coma and convulsions. Histological examination showed intense congestion of the brain, perivenous cellular infiltration round the veins of the brain, the spinal cord and meninges, small cellular accumulations in the grey matter, especially that of the pons, medulla and cornua of the spinal cord, and occasionally degeneration of nerve cells. The perivenous sheaths occurred not only in the grey matter but also in the white. They were frequently not uniformly distributed.

(2) The disease was unaccompanied by any undue prevalence of ordinary acute poliomyelitis (infantile paralysis).

(3) The disease was limited remarkably by climatic conditions, being confined almost entirely to the dry western part of the State. The mild and muggy coastal district and the cool highlands were with one exception—in Sydney—exempt from definite acute fatal indigenous cases. Further, with one exception, the Sydney case mentioned above, which occurred in September (spring), all the recognized cases occurred in the late summer and autumn.

(4) The disease has been conveyed from three human cases to monkeys (*Macacus rhesus*) by intracerebral inoculations of emulsions of the brain and spinal cord. From one of these monkeys a series of monkeys has been successfully inoculated, and from these monkeys the disease has been conveyed, directly or indirectly, to thirteen sheep, a calf and a horse. The disease in the monkey is characterized more particularly by exaggerated muscular movements and intense inco-ordination. Paresis and paralysis occur but are not recognizable in all animals and are usually overshadowed by the exaggerated muscular inco-ordination. The histological features in the monkey are similar to those in man.

(5) The disease has been conveyed from a monkey to sheep, and from sheep to sheep, and from sheep twice back again to the monkey, and from one of these monkeys to a series of further monkeys.

(6) All sheep similarly inoculated intracerebrally with the same material at the same time did not develop the disease. Some of such animals have been proved to be immune as shown by repeated inoculations of material known to be virulent. Other sheep have shown slight symptoms suggestive of encephalitis and have recovered. The disease in the sheep, a calf and a horse is characterized frequently by convulsions. Coma occurred in the horse and unconsciousness has been noted in the sheep. The histological lesions in the sheep, the calf and the horse are similar to those found in man and the monkey, with

the exception that frequently in the sheep the perivenous cellular sheaths are extraordinarily marked.

CONCLUSION.

The disease in question is a polio-encephalo-myelitis characterized by perivenous cellular sheaths and small cellular islands. It is conveyable to the monkey (*Macacus rhesus*), sheep, calf and horse. The clinical disease in man, the absence of accompanying cases of ordinary acute poliomyelitis, the conveyance of the disease to sheep, a calf and a horse, and the clinical symptoms manifested by these animals, as well as by the monkey, suggest that the disease in question is an entity distinct from ordinary acute poliomyelitis (infantile paralysis).

Demonstration of Preparations from Cases of Encephalitis Lethargica.

By C. DA FANO, M.D. (Univ. Pavia), and H. INGLEBY, M.B.

For the purposes of this investigation we were able to obtain material from three cases:—

Case I.—Woman, aged 54. Admitted to St. George's Hospital on June 10, 1918, under Dr. Ogle. For a week previously she had suffered from steadily increasing drowsiness and headache. On admission she was in a stuporose condition from which it was impossible to rouse her. She had bilateral ptosis but no other paralysis, and general muscular rigidity. Temperature normal. Lumbar puncture revealed nothing abnormal. Death took place ten days after admission.

At the autopsy there was no macroscopic lesion except some milkiness of arachnoid and slight injection of the cerebral vessels.

Case II.—Man, aged 49.—Admitted to St. George's Hospital on December 19, 1918, under Dr. Collier. Three weeks before admission he felt sick and drowsy. He improved for eight days, then complained of vomiting, pain in right trigeminal area, and diplopia. He became delirious, and was finally sent into hospital with a diagnosis of meningitis. On admission he was semi-conscious, restless and delirious. There was marked cervical rigidity (later a generalized muscular rigidity) and ophthalmoplegia of similar type. The cerebro-spinal fluid contained no excess of cells. The Wassermann reaction was negative in blood and cerebro-spinal fluid. He died on December 24.

Post mortem the most striking feature was the intense congestion of the brain and meninges. The mid-brain was visibly swollen. Everywhere the grey matter was a dull red on section. There was no exudate on the surface of the brain or on the meninges.

Case III.—This material was obtained, through the kindness of Dr. MacNalty, from a case of Dr. Forbes at Brighton. We have not yet been able to get the clinical details.

The material obtained from these cases was fixed partly in alcohol, partly in formalin, and stained by the following methods: Nissl's toluidin blue, Cajal's ammoniated alcohol-reduced silver, Bielchowsky (Da Fano's modification), Weigert-Pal and Marchi; in addition sections were stained with hæmatoxylin and eosin, iron hæmatoxylin, carmine, &c. Special reactions for iron, fat, and pigments, and certain methods for bacteriological investigation of tissues were used.

All parts of the nervous system were examined, but, in common with other observers, we found that the mid-brain and pons were the regions principally affected, though the lesions were by no means confined to them. Histological examination showed the presence of widespread lesions of inflammatory character consisting essentially in dilatation and engorgement of the blood-vessels, punctiform hæmorrhages, perivascular and parenchymatous infiltration by lymphocytes and plasma cells, active proliferation of the neuroglia elements and degeneration of the nerve cells—all of which have been described by different authors, whose work we propose to discuss in a longer communication. Dilatation and engorgement of the blood-vessels were especially marked in Case II, and here too the perivascular and parenchymatous infiltrations were extremely prominent. The latter was so intense that inflammatory cells covered several consecutive microscopic fields. The intensity of the reaction, together with the extension of the lesions to all parts of the nervous system is an index of the severity of the process, and may be a factor of importance in the differential diagnosis from other forms of encephalitis. Time does not permit of a careful analysis of the different elements constituting the so-called " small-celled " infiltration; this will be dealt with in a future paper.

We can likewise confirm the remarkable proliferation of neuroglia cells as regards increase in both numbers and size. Whether they really take part in the phenomenon known as neuronophagia is a point on which we prefer to reserve judgement for the present.

No degeneration of nerve fibres has been observed with either the Marchi or the Weigert-Pal methods.

With regard to the alterations in the nerve cells our cases show changes which seem to us more severe and widespread than those hitherto described. They range from slight chromatolysis to complete disappearance of Nissl granules, atrophy of the protoplasm, and shrinkage, atrophy and final disappearance of the nucleus. In Bielchowsky preparations the neurofibrils appear reduced in number, stain poorly, and are sometimes shrunk together in a clump in the centre of the cell. In very rare instances they seem to have disappeared completely. A striking feature of most of our preparations is the very great number of nerve cells, both near and at a distance from the points of infiltration, containing on one side an accumulation of so-called "yellow pigment"—a change which is hardly to be accounted for by the age of the patients but which may possibly be due to the severity of the disease.

Besides these alterations of general character which correspond, more or less, to those already known and are to a point common to many nervous disorders of inflammatory origin, our attention was drawn to a curious appearance seen in certain groups of nerve cells, in the protoplasm of which peculiar granules are visible. These granules vary in number; some cells are packed with them, others contain very few, and all gradations may be found between these two extremes. Their position differs in different cells according to their number and to the degree of degeneration of the cytoplasm. They are generally spread evenly over the cell and are never accumulated at one end as is the case, for instance, with the yellow pigment mentioned above. The granules measure roughly 1 μ in diameter, but they vary from the size of a filter-passing coccus to that of a streptococcus. In their general appearance they recall that of the pigment granules seen in red corpuscles in tertian malaria.

These bodies were first noticed by us as black masses in Bielchowsky preparations of the mid-brain in the neighbourhood of the substantia nigra, but as they were much smaller than the melanin granules in the cells of this region, and were also present in cells well outside the substantia, a search was made for them in other sections. We were able to identify them in almost all our preparations from the medulla oblongata to the thalamus, and they could even be found in the cerebral cortex and spinal ganglia. In Bielchowsky preparations they appear brownish-black; with toluidin blue, polychrome, methylene blue, Giemsa's and Leishman's stain they appear dark green. To our surprise we could easily recognize them in sections stained with hæmatoxylin and in unstained sections as small yellowish-brown granules. This led us to suppose that they consisted of pigment, but histo-chemical reactions threw no light on their nature. They do not react to any of the tests for iron; prolonged immersion in dilute acids and alkalies has no effect on them; they do not stain with Sudan or scharlach red, and attempts to test for sulphur were negative. The presence of these granules is associated with rapid degeneration of the cell, a portion of which may be swollen and diffusely stained while other parts still contain Nissl bodies. There is often a striking contrast between the eccentric, shrunken nucleus, and the comparatively healthy protoplasmic processes. Some cells are so packed with granules that the nucleus is almost invisible, the cell processes being sometimes intact and having sometimes completely disappeared. Others are reduced to shadows in which a varying number of granules still remain. In silver preparations the rapid destruction and clumping of the neurofibrils in the cell body (though not in the processes where these still exist) are in remarkable contrast to the condition seen in ordinary accumulations of pigment where the neurofibrils are pushed aside but not destroyed. We would point out that not all degenerated cells by any means contain these granules, and this may explain why other observers have failed to notice them. Granules are also present in the tissue outside the nerve cells and are frequently found inside various phagocytic cells.

The difficulty of explaining the presence of this granular, pigment-resembling, material in the nerve cells and its connexion with cell degeneration suggested investigation by bacteriological methods. Though our researches are still incomplete, in sections stained by Giemsa's or Leishman's method, followed by toluidin blue, we were able to detect, in certain cells, bluish-white bodies, oval or round in form, about half the size of red corpuscles. Some of these bodies appear in cells in which there are no granules, others occur where granules are present, and in this case there seems to be a granule in each body. This corresponds with the observation that in Bielchowsky, and sometimes in Nissl preparations, every granule appears surrounded by a sort of halo. These bodies are also found in nerve cells in frozen sections stained by Sudan III.

No similar appearance has been seen by us in preparations from cases of poliomyelitis, but our investigations are still proceeding. In our search through the literature of the subject we have not so far come across any description which coincides with our observations.

Section of Pathology.

President—Dr. W. BULLOCH, F.R.S.

Diffuse Emphysema of the Intestinal Wall (two cases), with Remarks upon Pneumatoses.[1]

By C. A. R. NITCH and S. G. SHATTOCK, F.R.S.

De emphysemate diffuso intestini parietum, cum de pneumatose commentariis.

Summarium disquisitionem sequitur.

PART I.

ONE thing which makes the remarkable condition we propose to record in the present communication of particular interest is the fact that its production as a post-mortem event may be absolutely excluded; for, in the first case, it was unexpectedly discovered during an operation for the treatment of pyloric stenosis; and, in the second, at an operation for what was thought to be an intussusception.

History.—The subject of the first was a schoolmaster, aet. 48, who had suffered from troublesome flatulence and recurring attacks of indigestion with epigastric pain, about one and a half hours after food, for fifteen years. The attacks lasted for a month or more, and the pain, which at times was very severe, was always relieved by vomiting. In 1912 the pain became almost continuous and was accompanied by increase of the flatulence and distension of the stomach. On the advice of his doctor he consulted Dr. A. E. Russell, who made a diagnosis of pyloric stenosis, secondary to ulceration, and advised an operation. As the patient refused surgical treatment, his doctor taught him to wash out his stomach with a rubber tube, and this he carried out daily for six years. The lavage conferred relief, but as might be expected, he became so weak and emaciated that in June, 1918, he only weighed 7½ st. He then again saw Dr. Russell, who succeeded in persuading him to submit to an operation. He entered St. Thomas's Hospital on June 29, 1918. He was very weak and thin. His stomach was so greatly dilated that its lower border was level with the crest of the ilium. There was moderate gastric peristalsis. I (C. A. R. N.) operated upon him on July 3 and found an extreme degree of stenosis of the pylorus, for which a posterior no-loop gastrojejunostomy was performed. On drawing up the great omentum to prepare the field for the anastomosis, a coil of small intestine, studded with greyish-white

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[1] At a meeting of the Section, held February 4, 1919.

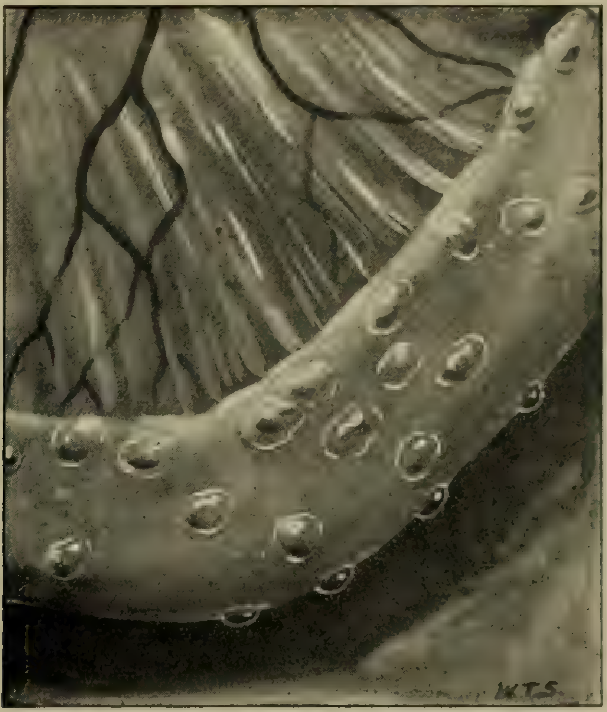

Fig. 1.

Portion of the small intestine from the case of pyloric stenosis described, as it appeared when exposed during life; showing numerous gas blebs projecting beneath the peritoneum. Redrawn from a sketch made by Mr. Nitch whilst the gut was exposed during life. (Natural size.)

Figurae explicatio.

Intestini tenuis portio ut apparebat quum in aegri corpore inspiciebatur. Sub membranâ serosâ plurimae projiciuntur cystes quae aere inflatae sunt. Apud pylorum duodenum valde constrictum est. (Magnitudinis naturalis.)

elevations presented in the wound. On close examination these proved to be multilocular subperitoneal cysts, and on puncturing one of them I was astonished to find that the contents were gaseous and not fluid. The cysts were dotted more or less evenly over the whole circumference of the bowel, and there were also a few, about twice the size of a pin's head, in the transverse mesocolon, and at the base of a few of the appendices epiploicæ. With the exception of the first 12 in. of the jejunum and the last 12 in. of the ileum the whole length of the small intestine was affected. The freedom of the first part of the jejunum was fortunate, as otherwise an anastomosis would have been attended with grave danger of leakage, owing to the multiplicity of the cysts. The mesentery of the small intestine, and the walls of the stomach, duodenum, and colon were normal. The patient made an uninterrupted recovery, and, two and a half months later, in answer to a letter, states that though he still has occasional flatulence it causes him no pain nor inconvenience. His bowels now act regularly without an aperient, he has gained 2 stone in weight, and has resumed his work.

The lesion naturally falls into the comprehensive group which has been designated Pneumatoses[1]; a group comprising the various conditions resulting from the presence of air, or the formation of gas, in the tissues; in contradistinction to dropsical accumulations of fluid, whether in connective tissue or in serous, synovial, or mucous cavities. At the present time a long list might be drawn up from such a pathological standpoint, although the generalization, by reason of the diversity of the conditions included in it and their etiological dissimilarity, is too artificial to be of any great clinical service.

In the following remarks the different forms of pneumatosis are, for the most part, merely enumerated, so well and generally are they known; any comments being confined to the less usual varieties. The group, if reconstructed, may be made to comprise:—

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[1] J. P. Frank, "De curandis hominum morbis. Epitome praelectionibus academicis dicata," Mediolani, 1812, lib. vi, "Pneumatosis," p. 38. "De curandis hominum morbis. Epitome juxta ejus praelectiones in clinico Vindobonensi habitas; a nonnulis suorum auditorum edita." Liber sextus. Editio secunda correctior. Vienna, 1821, "Pneumatosis," p. 19. The subject of pneumatosis is developed by Frank at considerable length, further detail being added in the later of the two editions above given. The formation of gas by bacteria being then unknown, the author's arrangement of matter, and his deductions are to this extent faulty.

(I) BACTERIAL PNEUMATOSES: GAS PRODUCTIONS IN THE LIVING BODY, IN WHATEVER POSITION ARISING, DUE TO THE AGENCY OF *Bacillus aërogenes*, *Bacillus œdematis maligni*, *Bacillus œdematiens*, OR *Bacillus coli*.

Besides the various forms of **Gas-cellulitis** and **Gas gangrene**, there would be included the **Pneumo-hæmothorax** resulting from the infection of blood in the pleura, with aërogenic bacteria, now so well recognized a complication of infected gunshot perforations of the thoracic wall and lung; the gas production in the vaginal wall, in **Vaginitis emphysematosa**; and the **Intra-uterine**, which takes place from the death and decomposition of the fœtus. The emphysematous variety of vaginitis is described as occurring in pregnant women, or after parturition, in women the subjects of gonorrhœa, by the formation of hard congested papules which suppurate and become filled with gas; the gas being produced by *Bacillus aërogenes*.

Closed tympanitic abscess, due to gas-forming bacteria, without perforation of the intestinal or respiratory tract: Of this a better example could hardly be cited than that recorded by Hunter[1]: "In one instance I have discovered air in an abscess which could not have been received from the external air, nor could it have arisen from putrefaction." There was no communication found after death with either the rectum or uterus, but there was a small communication between the abscess and the bladder. It was only towards the latter end of life, he remarks, that the air could have made its escape into the cavity of the bladder, for it was not possible to squeeze the air out of the tumour when the patient was first seen; but just before death the swelling became more flaccid. The swelling was situated in the lower and right side of the abdomen, extending nearly from the navel to the spine of the ilium on the right side. It was tense, and could be made to sound almost like a drum. It had come on within a few weeks. At the autopsy a cavity was found between the bladder, uterus, and vagina, on the right side, something like an abscess. From the side of this cavity there was a canal ascending to the brim of the pelvis, and communicating with the tumour. Hunter excluded putrefaction since there was no foul odour when the swelling was opened. This, of course, only means that the gas formation was not due to the colon bacillus.

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[1] Works, Part IV.

Pneumoperitoneum, from gas formation following perforation of the vermiform appendix, intestine, or stomach. Here the pneumatosis may, in some cases, be due to a bacterial formation of gas *in loco;* in others, the intraperitoneal gas is produced partly *in loco* by the bacteria in extravasated fæcal material, and is partly that displaced from the lumen of the stomach or bowel. The passage of gas from the intestinal canal into the urethra, vagina or uterus, through fistulæ, whether perforations caused by ulceration, or malignant growth, or communications of a teratological kind do not require comment. Nor does the tympanitic distension of the stomach and intestine from the accumulation of gases, brought about by mechanical obstruction, by the reflex inhibition of intestinal tone, or by abnormal fermentation, &c.

PNEUMATOSES DUE TO THE ENTRANCE OF AIR INTO THE SEROUS CAVITIES, THE CONNECTIVE TISSUE, OR THE ALIMENTARY OR GENITO-URINARY TRACTS.

Pneumothorax.—The escape of air into the pleura, though commonly the result of injury to the lung through the thoracic wall, or of the thoracic wall alone (as when a subphrenic abscess is opened by the thoracic route), is in rare cases due to perforation of the lung from disease. So good an instance of the latter was recently observed at St. Thomas's Hospital by Dr. C. R. Box, that it may be here cited. It is thus described in the museum catalogue of the hospital.

1866 A: The right lung of a child 3 months old. The upper lobe has been longitudinally divided to display a somewhat irregular cavity about the size of a walnut, which is partially filled with necrotic material, and has resulted from the necrosis and disintegration of a tubercular focus. The vomica communicates through a small circular aperture with the pleural cavity: the pulmonary tissue around is thickly strewn with miliary tubercles. The perforation was followed by pneumothorax. The lower lobe is shrunken from collapse. The patient had suffered from cough for three weeks. Dyspnœa suddenly developed (from the escape of air into the pleura), and the patient died the same day.

In connexion with pneumothorax, lastly, must be added that produced surgically by the injection of nitrogen to procure collapse of the lung in the treatment of pulmonary vomicæ; and the forcible injection of oxygen into the pleural cavity for the complete evacuation of intrathoracic effusion.

Pneumoperitoneum, of non-bacterial origin. In rare cases to be presently cited, it has been inferred that gas may find its way into the peritoneal cavity from the intestine, without perforation. The entry of air, it may be in considerable amount, which not infrequently occurs on opening the abdomen, in the Trendelenburg position, is a form of pneumoperitoneum resulting from the negative pressure produced by the gravitation of the abdominal viscera. The admission of air is devoid of any adverse consequence, even if the abdominal parietes are sutured without its evacuation. As in a pneumothorax, the oxygen and carbon dioxide of the included air would, doubtless, owing to their greater solubility, be absorbed first; the nitrogen, last. Mr. R. I. Pocock, the

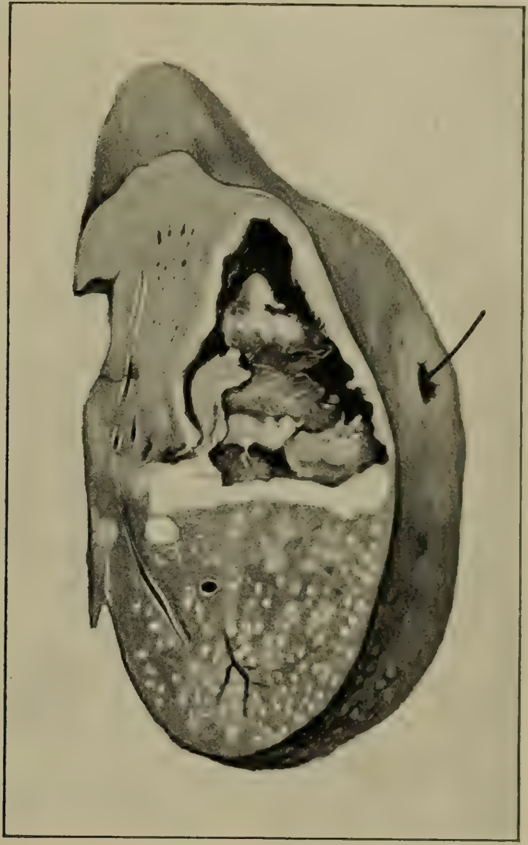

FIG. 2.

The lung of an infant showing a small perforation (marked with a bristle) over a tubercular cavity, from which pneumothorax resulted. Dyspnœa suddenly developed; death occurring the same day.

Figurae explicatio.

Infantis pulmo in quo cavitas e tuberculose orta est, cavitate in pleuram nuper apertâ. (Magnitudinis naturalis.)

Superintendent of the Zoological Society's Gardens, tells us that he once saw a collection of air in the abdominal cavity of a newt, so extensive as to force the animal to float in the supine position; on puncturing the distended cavity it quickly refilled; death occurred shortly afterwards. The lungs in this batrachian are two simple tubular sacs, which lie free within the abdomen, and in immediate contact with the intestines, there being no trace of a diaphragm. A rupture of the lung under these circumstances would be followed, therefore, by pneumoperitoneum, and this is apparently what had happened.

Pneumopericardium.—In gunshot injuries, the chest wall, lung, and pericardium, may be successively perforated without immediately fatal result, but there does not appear to be any case on record of air having reached the pericardium under such circumstances. The production of gas from bacterial infection of the injured sac has, of course, to be ætiologically differentiated.

After penetrating wounds of the chest in the cardiac region, Mr. S. Maynard Smith[1] has observed a peculiar double click corresponding with the heart sounds, and heard on auscultation, or sometimes even at the foot of the patient's bed. As a rule, it disappears after forty-eight hours. The absence of pericarditis shows that pneumopericardium from the entry of air, or from gas formation, is not the explanation of the phenomenon; and the only suggestion as yet made is, that it arises in some way from the presence of air in the mediastinal connective tissue.

THE PRESENCE OF AIR IN THE GENITO-URINARY, AND ALIMENTARY TRACT.

Akin in its mode of production to pneumoperitoneum arising from the entrance of air during laparotomy is that which takes place spontaneously into the **Vagina**, from which it may be afterwards expelled. The occurrence was well known to Hunter (Works, vol. iv), from observation and inquiries of his own. In one of his cases an examination made during life, and again after death, upon the same individual, disclosed no disease either of the vagina or of the uterus, a circumstance which led him to think that the gas was "secreted or let loose from the blood." The presence of air in the vagina, it need hardly be said, is due to its entry under the negative pressure accompanying a temporary displacement of the abdominal viscera, such as may happen during reclining or stooping, and occurring in subjects with a weak vaginal sphincter. Visceroptosis would doubtless predispose to the condition by facilitating the production of such a negative pressure: and some such defect is probably the factor which leads to this "ballooning" of the canal. In one instance, however, the entry of air was associated with a defective development of the labia and nymphæ, and prolapse of the anterior wall of the vagina. This case is from the Russian,[1] and in comment, it may be observed, that by a certain Russian sect [Skoptzi] mutilation of the female (and male) external genitals is practised as a religious rite; not improbably the defect referred to resulted in this way. In the same manner, when a vaginal examination is made with the speculum, in the Trendelenburg position, a free entry of air may take place as soon as the sphincter is passed and its action annulled.

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[1] "Pericardial Knock," *Brit. Med. Journ.*, 1918, i, p. 78.

The presence of air in the vagina is a matter of ancient knowledge. In the earlier edition of Frank (loc. cit.), it is alluded to as "garrulitas vulvæ," for which "garrulitas uteri" is less correctly substituted in the second edition; and equally incorrect is the term "garrulitas vaginæ" sometimes used; the first of the words, in each case, indicating, of course, the noise occasioned by the escape of the included air. The expression "garrulitas" is referred by Frank (loc. cit.) to the Roman epigrammatist, Martial. In the original it is used without any second qualifying word, the site of the air being deduced from the context.[2]

Uterine pneumatosis may arise from the inclusion of air in the uterus after expulsion of the fœtus. In other cases, as already mentioned, it has a bacterial origin, and follows upon the death and decomposition of the fœtus.

Air may even find its way into the **Urinary bladder** in small quantity when a catheter or the cystoscope is passed, in the Trendelenburg position, should the viscus contain only a little urine: the air may be afterwards evacuated with the urine, or found in the bladder when this is opened suprapubically for the completion of a surgical operation. The *modus operandi* of Kelly's speculum for the cystoscopy of the female bladder and ureteral catheterization, is dependent upon the free entry of air which takes place into the viscus when the instrument is passed in the Trendelenburg position.

A further instance of the same class is the entrance of air into the **Rectum** when the speculum is passed in the knee-elbow posture, or with the pelvis raised and the patient on the left side. The negative pressure resulting from the gravitation of the abdominal viscera causes the bowel to balloon up for several inches beyond the end of the speculum, and greatly facilitates the inspection of the interior. And the same thing occurs in the pelvic colon beyond the sigmoidoscope.

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[1] *Lancet*, July 23, 1892, p. 238.

[2] Liber, 7; epigram, 18; Marii Valerii Martialis Epigrammata. Ex editione Bipontina: A. J. Valpy. London: 1823.

The most curious examples of rectal pneumatosis, however, are those where air can be voluntarily aspirated into the bowel. The first case of this kind is recorded by Marcel Baudouin,[1] under the title, "Un cas extra-ordinaire d'aspiration rectale et d'anus musical." It will be enough to state that the aspiration occurred for the first time, quite unexpectedly, and much to the subject's surprise, whilst he was swimming, the sea-water being afterwards evacuated. He found that by making certain movements he could store water, and later on air, at will. For the latter purpose, standing upright, he would bend the trunk forwards so as to bring the chest nearly horizontal; the knees were then grasped with the hands so as to give a firm *point d'appui* to the upper limbs. After a short inspiration the arms were stiffened, and a considerable effort and certain movements being made, air entered the bowel with a muffled noise like that of inspiration through the lips when half closed. The expulsion of air could be so regulated as to produce notes of varying pitch, and even recognizable airs. Since the publication of this case several others of the same kind have been recorded, as will appear from the subjoined list which Dr. Arthur Saunders was good enough to compile.[2]

The regular aspiration of air into the Œsophagus and the immediate dilatation of the latter when the straight tube of the œsophagoscope has passed the lower sphincter of the pharynx (or upper sphincter of the œsophagus) is a striking phenomenon, and may be viewed as largely if not entirely due to the negative pressure or *vis a fronte* set up by the descent of the diaphragm, and the expansile movement of the thoracic wall: for it is a matter of clinical observation that the passage of the instrument is accompanied with an involuntary inspiration: during the examination, the patient, it may be said, is in the strictly supine position, with the head lowered. The slow, minor rhythmical movements of dilatation and contraction observable in the tube when

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[1] *La Semaine Méd.*, Avril 20, 1892, No. 19, pp. 144-146.

[2] "Musical Anus," V. E. Allaben, *Weekly Med. Rev.*, St. Louis, 1892, xxv, p. 511. "Un nouveau cas d'aspiration rectale et d'anus musical chez la femme," Marcel Baudouin: *Gaz. Méd. de Paris*, 1898, p. 266. "Les Anus musicaux en Extrême-Orient," Dr. Michaut. *Gaz. Méd. de Paris*, 1898, p. 324.

so dilated up, are probably due to the fluctuations in the negative pressure occurring with respiration. This is more probable than that they represent the beats or so-called pendulum movements of the normal intestine, as distinguished from its peristalsis and the segmentation movements discovered by Cannon. This is a subject, however, worthy of further physiological study.

Apart from œsophagoscopy a similar occurrence from displacement of the viscera, is at times observed during operations upon the abdomen, the air being aspirated into the stomach, whence it may be expelled by external pressure.

The aërophagy and subsequent distension of the stomach in hysteria, although not a phenomenon in precisely the same category, may be alluded to here. And quite apart from any neurosis, some are able to swallow air by a voluntary effort, and in such amount as to produce a visible abdominal swelling. In the horse, aërophagy is familiar to veterinary surgeons; certain animals acquiring the habit to such a degree as to be known as "wind- or air-suckers." The acute form of tympanites of the rumen in cattle, which follows surfeit with green clover or grass, is due to the liberation of gas from the ingesta, and not to aërophagy. The distension may cause death from heart failure: it is at once relieved by puncturing the rumen with a trocar and cannula. The foolish practice amongst operatives in engineers' shops, of inserting the nozzle from a compressed air supply into the mouth of a fellow workman, or over the anus (outside the trousers), may be mentioned to close this group, for in both cases it has been followed by fatal results.

Lastly, air may enter a **Joint**, certainly, at least, the knee, on its being surgically opened. When the knee is flexed and the synovial membrane exposed by dissecting through the fibrous capsule (for the removal—e.g., of a loose body) the membrane is found firmly withdrawn over and between the articular ends of the bones, and on its being incised the negative tension within is at once relieved by the entry of air, which can be expressed at the conclusion of the operation.

Into the category of pneumatoses from the admission of air would fall, also, the **Inflation of Abscess cavities.** Setting aside the minor examples where a periglandular abscess discharges into the lower part of the trachea, and becomes thereupon temporarily filled with air, we can adduce one example, which was recorded by Mr. H. H. Clutton,[1] and of which the specimen is contained in the museum of St. Thomas's Hospital.

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[1] *Trans. Path. Soc. Lond.*, 1887, xxxviii, p. 130.

Specimen No. 910: A tongue with the larynx and parts below. Behind and to the right side of the œsophagus and pharynx there is an extensive, somewhat irregular cavity, lined with granulation tissue. Rods of glass have been passed from the cavity (which reaches below as far almost as the arch of the aorta) through a small circular aperture of communication, into the trachea, and through a second, larger, oval one about ¼ in. in chief diameter, into the left side of the œsophagus; this lies at a slightly higher level than the tracheal; both are well defined. From a man, aged 24, subject to epileptic fits. On September 13, after a violent fit, he noticed pain and swelling in the neck, from which the disease dated. Death occurred from septic broncho-pneumonia. That the abscess had opened into the adjacent passages appeared, during life, from the presence of pus behind the pillars of the fauces. After leaving the hospital (October 4, 1885), he attended as an out-patient. On October 6 there was scarcely anything to be seen on inspection of the neck, but on digital examination in the position of the abscess, crackling could be felt: this disappeared on pressure, but reappeared when the patient was directed to cough, or to strain, with the mouth and nose closed. October 13: Air could no longer be forced into the cavity. He was re-admitted on October 23, with broncho-pneumonia, and died on November 3. The cause of the abscess was, conjecturally, some trauma of the œsophagus occasioned by the swallowing of a foreign body during the epileptic fit.

Emphysema of **Connective-tissue** from the entry of air. The emphysema, whether subcutaneous or of the deeper tissues of the mediastinum, after injury to the lung and thoracic wall; the interlobular emphysema of the lung itself, following rupture of its vesicles, or extending from a mediastinal emphysema by way of the root of the organ, are things merely to enumerate. And equally so is that of the neck following wounds of the larynx or trachea; or that arising during tracheotomy from the impeded exit of air caused by faulty manipulation in the insertion of the tube.

The emphysema of the neck which may accompany paroxysms of coughing in phthisis, or pertussis in children, results from the rupture either of pulmonary tissue or of bronchioles in the vicinity of the hilum, whence the air is driven upwards through the mediastinal connective tissue, and so beyond the confines of the thorax. In a few instances the phenomenon has been observed after the lodgment of foreign bodies in the air passages, the mechanism of its production being the same as in the diseases cited. Eppinger[1] views the multilocular sacculation of the trachea found in some cases of respiratory obstruction as due to the inflation and dilatation of the mucous glands. To this it may be added that the emphysema following acute obstructions, were its precise origin traceable, might in some cases be found to arise from the rupture of such distended glands, for these are distributed not only in the wall of the trachea, but in the bronchi and their subdivisions.

Cervical emphysema as a complication of pulmonary influenza is referred to by three speakers in the "Discussion on Influenza," held at the Royal Society of Medicine, 1918.[2] From the neck the emphysema may spread over the whole body. The respiratory symptoms may be unimportant, and paroxysms of coughing absent. As pointed out by Sir Bertrand Dawson and General W. S. Thayer, this creates a difficulty. The emphysema accompanying influenzal pneumonia is most probably due to the fact that the pulmonary infection is of a mixed kind, and that the pyogenic bacteria bring about perforation of the terminal bronchioles, the final result being parallel with that seen in a hæmorrhagic inflammation.

Emphysema of the neck is a well established complication of "gassing." Of this there are three examples in the collection of War specimens in the Museum of the Royal College of Surgeons. These antedate the introduction of "mustard" gas, and were due to the action of chlorine alone, or combined with phosgene. In one (No. 128) death occurred fifty-one hours after "gassing." Post mortem: Much froth on the lips and nares; emphysema of the mediastinal and peribronchial tissue, none of the subcutaneous tissue of the neck. When admitted, thirty-six hours after being gassed, the patient was cyanosed and unconscious. In the second (No. 130), death took place after thirty-six hours, the patient being cyanosed, unconscious, frothing at the mouth, and expectorating yellowish fluid tinted with blood. Post mortem: Lung nearly solid from œdema; interlobular emphysema, and extensive emphysema of the connective tissue of the neck. In the third (No. 126), death ensued fifty-eight hours after gassing; there was marked cyanosis. Post mortem: At the lower part of the lung air had escaped into the interlobular connective tissue; there was emphysema of the connective tissue of the neck, both superficial and deep, extending from the mediastinum. When admitted, December 20,

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[1] "Path. Anat. des Kehlkopfes und d. Trachea," Klebs' "Handbuch der pathologischen Anatomie," Berlin, 1880.

[2] *Proc. Roy. Soc. Med.*, 1919, xii, pp. 60, 64, 100.

1915, the breathing was irregular, and gasping; the râles in the chest were audible several feet away; there was marked cyanosis. The patient had been gassed probably the day previously.

The macroscopic anatomy of these three specimens is practically identical. In each, the lung is almost solid from the (artificial) coagulation of the albuminous exudate filling the alveoli; scattered through it there are other areas in which compensatory emphysema has taken place. One factor concerned here in its causation may be the rapid production of compensatory emphysema which takes place in the small areas of pulmonary tissue distributed between those which are filled with serous exudate and thrown out of action. The intra-alveolar effusion resulting from chlorine gassing, with its accompanying compensatory emphysema, is of rapid onset. That the latter *per se* may suffice to bring about a rupture of the alveoli appears borne out by the clinical observation of Dr. T. R. Elliott, that in phosgene poisoning where there is pronounced pulmonary œdema, with little coughing, subcutaneous emphysema, although rare, occurs. In this connexion, it is of interest to know that experimentally the rabbit may be killed by the contralateral emphysema and pneumothorax produced when collapse of the opposite lung is brought about by the insertion of a laminaria plug in the bronchus. In the case of chlorine gassing the violent cough set up in the earlier stage is doubtless the second factor which renders subcutaneous emphysema more frequent than in the other.

The artificial production of emphysema has been practised for various purposes: in horses, to conceal bony eminences and give a delusive appearance of fatness; by the Chinese in the treatment of sciatica and chronic arthritis; and even in children by inhuman parents in order to excite pity for the purpose of begging, the skin being punctured behind the ear, and the subcutaneous tissue inflated so as to simulate hydrocephalus (J. P. Frank, loc. cit.).

The dishonest custom, once common, of inflating the subcutaneous tissue of calves, after killing, is at present illegalized in this country.

There is one grave, morbid condition, in the treatment of which a form of pneumatosis is practised, however, which is so efficient that it is fully established in veterinary medicine. In the so-called "drop" or "milk fever" of cows which arises, in a small percentage of the animals, a day or so after calving, and leads to fatal coma, it is the practice to force air into the udders through the teats, each of which has a central canal, at the bottom of which the lactiferous ducts open.

The striking and regular result of this treatment is almost immediate; the coma rapidly passes off and the animal completely recovers. The pathogenesis of the disease, and the *modus operandi* of the injection are, as yet, undetermined. This therapeusis replaced the injection of potassium iodide solution into the ducts—a procedure based on the hypothesis that the disease was due to bacterial infection. The substitution of air arose as the result of an accident: by an oversight the solution was not put into its receptacle, and air was unwittingly pumped in in its place, with identically the same benefit. The disease so plainly suggests a parallel with post-partum eclampsia in the human subject as to raise the question whether a similar mode of treatment may not be indicated in the latter.

It has been asserted that persons in the habit of playing on wind instruments not infrequently suffer from a painful inflation of the cheeks, arising from the forcible introduction of air into the connective tissue through lacerations of the buccal mucous membrane. We have been unable to obtain any confirmation of this statement, although *pain* in the cheeks is a well known result under such circumstances.

Mr. Herbert Tilley has seen a submucous emphysema arise when a fine Eustachian bougie had, by misadventure, perforated the mucosa of the tube, inflation being afterwards carried out through a catheter. The emphysema spread into the corresponding side of the soft palate and pharynx, and even to the subcutaneous region below the lobule of the ear and behind the angle of the jaw. And in a case witnessed by Mr. H. J. Marriage, the air extended down the neck as far as the clavicle during an attempt to inflate the tympanum, after the mucosa of the tube had been injured by the Eustachian catheter.

In the *St. Thomas's Hospital Reports*, xxxvii, there is tabulated the case of a female child, 1½ years old, in whom a subcutaneous emphysema appeared on the left temple and left side of the face, after a paroxysm of coughing, but the site of the trauma in this case was not ascertained.

A local subcutaneous emphysema of some practical interest is observed now and then at the site of punctured wounds limited to the skin and muscles of the abdominal parietes, whether due to gunshot missiles or pointed instruments (W. H. C. Romanis). The entry of air is occasioned by the negative pressure produced by the expiratory movements, the aperture itself being oblique in direction, and so valvular in kind. The importance of its recognition arises, as Mr. Romanis observes, from the possibility of its being erroneously taken as evidence of intestinal perforation, whereas the peritoneal cavity itself is intact. Something of the same kind is observed at times in paracentesis of the chest, when a local inflation of the subcutaneous tissue about the puncture occurs from a like cause.

As still less known is subcutaneous emphysema of the neck in birds, of which there is a curious specimen in the museum of the Royal College of Surgeons:—

A. 4017: A young skylark (*Alauda arvensis*), 14 days old. The neck is remarkably and symmetrically swollen from emphysema of the subcutaneous tissue. Two other birds from the same nest were quite normal. Superiorly the air extends beneath the mandible to the tip of the beak, but not between the eyes, nor over the vertex

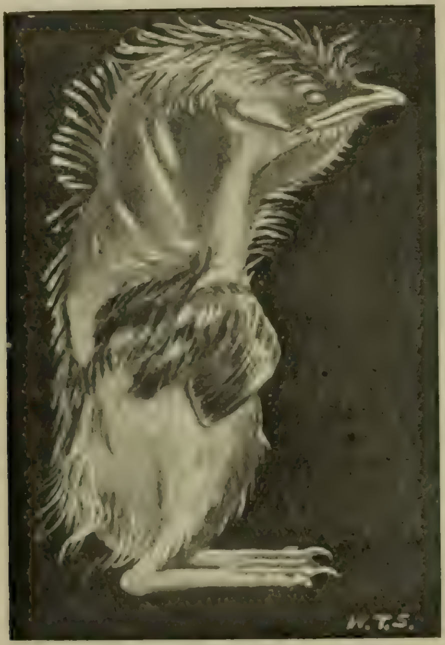

FIG. 3.

A skylark (*Alauda arvensis*), 14 days old, showing emphysema of the subcutaneous tissue of the neck due to injury either of the trachea, or of one of the air sacs at the root of the neck. The neck of the bird is readily discernible passing through the front of the cavity. (Natural size.)

Figurae explicatio.

Avis (*Alauda arvensis*), dierum quatuordecim cujus in cervice cutis monstruose inflata est. Aut trachea aut sacculus cervicalis qui cum pulmone normaliter communicat, parentis rostro fortasse perforatus est in progenie alendá. (Magnitudinis naturalis.)

of the skull; nor does it reach over the front of the thorax or front of the abdomen, though it lies between the wings and passes downwards to the sides of the thighs, omitting the lumbar region.

The anatomical distribution of the emphysema can be easily reproduced after death by inflating the subcutaneous tissue of the neck in any small bird, its higher limitations being due to fascial attachments. The air sacs of birds were described simultaneously by Hunter,[1] and by Camper, in Holland. Suffice it to state that they are quite distinct from the spaces of the general connective tissue, and receive their air directly from the lungs; some lie in the neck, some in the abdomen, and others extend into the shafts of many of the long bones, which are filled with air instead of marrow. Hunter (loc. cit.) remarks that when birds break any of such bones the surrounding parts often become emphysematous. "Besides the attachment of the lungs to the diaphragm, they are also connected to the ribs and to the sides of the vertebræ." "Such adhesions are peculiar to this tribe of animals, and . . . necessary in lungs . . . out of which it is intended the air should find a passage into other cavities." "There are openings in the lungs by which air is transmitted to the other parts, and the diaphragm is perforated in several places with holes of considerable size, which admit of a free communication between the cells of the lungs and the abdomen." "At the superior part the lungs have a communication with the large cells of a loose net-work, through which the trachea, œsophagus, and great vessels pass as they are going to and from the heart." (Hunter, loc. cit.)

In the accompanying figure is shown the trilobed upper limits of the air sacs at the root of the neck in a nestling tit, as they appeared when inflated. The projection occupies the fossa bounded by the united clavicles, and lies immediately in front of the trachea (on the left-hand side), and the cervical spine. The pharynx is remarkably capacious and passes into an œsophagus proportionally wide, which enters the thorax without expanding (as in some birds) into a reservoir or crop, and eventually opens in front of the lungs into a more thickly walled glandular stomach. In the common pigeon a tripartite extension of the air sac projects in the same way for a short distance into the root of the neck, as may be easily demonstrated by inflation through a cannula tied into the trachea after the crop has been opened and emptied of its contents through a free incision from the front. The distribution of the air sacs in birds may be displayed radiographically by the injection of bismuth mucilage into the trachea, after expression of the air from the sacs and lungs.

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[1] "Works," iv, p. 176. "Of Air Cells in Birds.

A proper homologue of such an emphysema would be limited, in the human subject, to injuries implicating the frontal, maxillary, or other accessory sinuses, or the tympanum and mastoid cells. In the situation first mentioned the complication is a recognized one. In the *St. Thomas's Hospital Reports* (1905), for instance, there is a case of fracture involving the outer wall of the frontal sinus, in a man, aged 52, in whom emphysema of the forehead and left temple ensued from the forcible extravasation of air, produced either by sneezing, or by blowing the nose to get rid of blood in the nasal cavity. The patient recovered. But we are not acquainted with a comparable result arising after perforation of any of the other cavities enumerated, either from surgical

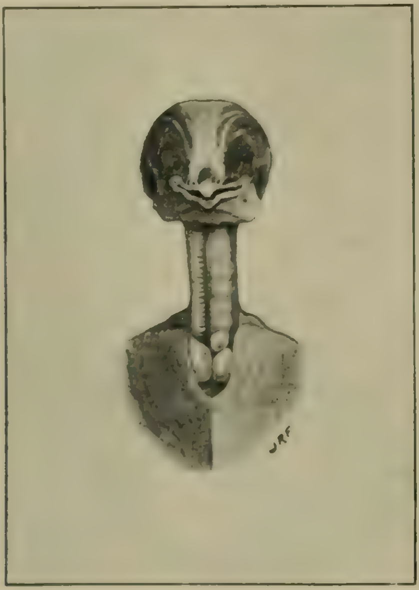

FIG. 4.

The neck of a nestling tit (*Parus* —— ?) viewed from the front, the feathers alone having been removed. Lying beneath the skin, immediately in front of the trachea (on the left-hand side) and the cervical portion of the spinal column, there is a trilobed elevation filled with air, which represents the highest part of the complex air-sac about the vessels at the root of the neck. (Natural size.)

Figurae explicatio.

Avis immaturæ (*Parus* —— ?) cervix a fronte aspecta, plumis avulsis. Ante tracheam et columnam vertebralem monstratur eminentia tripartita aere inflata, quae partem supremam repraesentat sacculi intrathoracici cum pulmonibus communicantis. (Magnitudinis naturalis.)

operation or disease. The well known emphysema at the root of the nose which may be produced by forcible expiration after fracture of the nasal bones, is not, of course, a homologue of the escape of air from an air-holding bone.

In this admirable paper (p. 185), Hunter has the following suggestive sentence: "How far this construction of the respiratory organs may assist birds in singing deserves investigation, as the vast continuance of song between the breathings, in a canary bird, would appear to arise from it"—a subject that has since been elaborated. Dr. J. A. Murray has reported[1] a case of sudden death in a Chilian sea eagle from the rapid overdistension of an abdominal air sac as a result of valvular closure of the mouth of the sac by blood clot.

That an inflated air sac might rupture during singing, and the accident be followed by subcutaneous emphysema, is credible enough. Nevertheless, an inquiry at the different aviaries of the Zoological Society yielded the definite information that no such occurrence had been observed either in singing or other birds; nor had it been seen in any birds examined after death, a practice invariably carried out; and the result is too striking to have escaped notice. In the case of the lark, such a theoretical explanation certainly cannot be advanced, since the bird was only 14 days old. The emphysema may have arisen from the parent bird having punctured one of the cervical air sacs from the throat, or having introduced some foreign body, whilst feeding the nestling; for the pharynx and œsophagus are very capacious, and the beak of the lark is long and sharply pointed. In this bird there is no dilatation, or crop, at the lower end of the œsophagus, the latter passing (within the thorax) into a more thickly-walled, glandular stomach, and the latter into the gizzard. Or, taking into account the distance between the upper limit of the air sacs and the pharynx, the perforation, more probably, took place into the trachea, which lies immediately in front of the œsophagus, the opening having been of such a kind as to admit of the escape of air into the connective tissue without its return by the trachea or through the œsophagus.

Air Embolism or Intravascular emphysema.—Although this commonly takes place in an open wound from the incision or rupture of a vein in the neighbourhood of the thorax, and results from the negative pressure or *vis a fronte*, produced in the veins by the inspiratory expansion of the chest, there are rare exceptions. In a case which recently came to our knowledge, it arose during urethroscopy. The examination was being made in order to deal with a bleeding point at the site of a stricture. During the inflation of the urethra by means of the Wyndham Powell aëro-urethroscope, the patient collapsed and died, in spite of recourse to artificial respiration. After death air was found in both of the ventricles of the heart. Here the air was, without doubt, pumped into a bleeding vein, the mouth of which was probably rendered patulous by its involvement in the indurated tissue at the site of the stricture. The presence of air in the *left* side of the heart as well as in the right does not present any difficulty, seeing that the blood can be translated after death from the right side to the left by the employment of artificial respiration, and that this was carried out in the case under consideration. As a matter of fact, moreover, it is not difficult to drive air after death from the right heart, through the lungs, into the left. Observation: In a cat, shortly after death, an ordinary double hand bellows was connected up with the right external jugular vein; the bellows was distended after pinching the exit tube; the air, suddenly liberated, and the vein tied. The front of the chest was then removed and the pericardium slit open; the right ventricle was found inflated. The animal was now submerged in a long tank of cold water, and the heart being held so that the left ventricle was uppermost, the latter was incised *gradatim* in its long axis midway between the interventricular grooves; blood, freely admixed with minute bubbles of air, escaped. After the intake of air, again, under negative pressure, the contraction of the right ventricle does not immediately cease, but supplies a *vis a tergo* which may propel part of it through the lung into the left side.

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[1] *Proc. Zool. Soc.*, 1919.

In connexion with the passage of air through the lungs during life, one remark may be made—viz., that in the dog a considerable amount may be introduced into the circulation through a vein without a fatal result, the gases becoming dissolved in the blood. Under such circumstances, when the body is immersed after death, in hot water, gas is liberated. Air might thus be found in the left side of the heart without its having traversed the lungs in the gaseous state. It is well known too, in surgery, that a certain amount of air may be heard to enter a vein, in operations about the neck, without a fatal result. The appearance of gases in the blood and from the tissue-lymph in caisson disease is, it need not be said, a liberation due to too rapid decompression of the body after its subjection to an abnormal degree of atmospheric pressure, and a consequent excessive solution of the oxygen and nitrogen of the air in the blood.

PART II.

To return now to the first of the two cases with which the present communication is concerned. As already stated, the exterior of the whole of the small intestine, commencing about a foot beyond the duodenum, was covered with hemispherical or hemiovoidal blebs of gas which collapsed on puncture. The condition was associated with a close stricture immediately beyond the pylorus, and was accompanied with a long-standing dilatation of the stomach, the lower border of which was level with the crest of the ilium.

EXAMINATION OF PORTION OF THE SMALL INTESTINE EXCISED DURING LIFE.

For the purpose of investigation a V-shaped piece of the intestine was excised transversely to its long axis, so as to leave the mesenteric border intact, the gap being immediately sutured without any untoward consequences. Its mucous membrane was raised in rounded, confluent

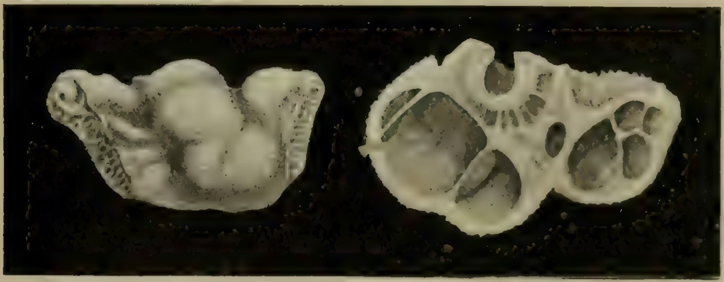
A B

FIG. 5.

(A) a narrow piece of the small intestine, excised during life, viewed from the inner aspect. The mucous membrane is raised in hemispherical eminences by the presence of gas in the submucosa. At each end a portion of the divided muscular coat is shown. (Natural size.)

(B) a section made through a portion of the same piece of small intestine, showing the multiple cavities beneath the mucosa; the muscular coat is recognizable at the top of the specimen. (Twice natural size.)

Figurae explicatio.

(A) Portio ex eodem intestino excisa. Membrana mucosa projicitur ut in bullis aquosis, ab emphysemate autem parietum. Apud utramque extremitatem monstratur portio tunicae muscularis. (Magnitudinis naturalis.)

(B) Sectio verticalis ejusdem portionis ex intestino tenui excisae. Monstrantur cavitates sive cystes quae sub membranâ mucosâ projiciuntur, et aere inflatae sunt. (Bis magnificata.)

elevations, obviously filled with gas. On the peritoneal aspect the intestine at this particular spot was normal, although at first sight the thinness and translucency of the wall led to the belief that the gas cysts were beneath the peritoneum.

Histology.—Sections cut in paraffin and stained with Ehrlich's hæmatoxylin and eosin yield the following results : The walls of the spaces (which are limited to the submucosa) consist of ordinary connective tissue in which there is an utter absence of small-celled infiltration or of any of the marks of inflammation. Their inner surface is lined with a simple endothelium which is most satisfactorily seen when part of a trabecula is viewed on the flat ; the cells form an extremely thin, continuous mosaic, and are furnished with large oval nuclei of the usual type. Here and there a flattened, multinucleated giant cell is intercalated between them. In the connective tissue of the submucosa in the neighbourhood of the cysts, and between the layers of muscle, the strands of sympathetic fibres and the nerve cells of Meissner's and Auerbach's plexuses are particularly distinct, and normal. Both the mucosa and the muscular wall are quite intact.

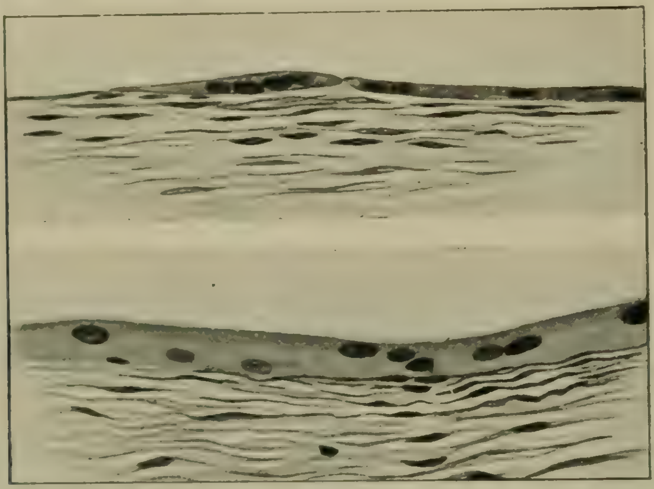

Fig. 6.

Microscopic sections showing the endothelial lining of the cysts, In the upper it is thinner than in the lower, and includes a flattened multinucleated cell. The histological signs of inflammation are quite absent. ($\frac{1}{6}$ obj.)

Figurae explicatio.

Sectiones microscopicae cystium quarumdam intra parietes intestini formatarum. Monstrantur endothelii cellulae quibus cystes intus teguntur. Cellularum una multis nucleis praedita est. Inflammationis nota totaliter absunt. ($\frac{1}{6}$ obj.)

Certain of the spaces have a thin wall of connective tissue differentiated from that around by its concentric disposition. The presence of so complete an endothelial lining indicates that the spaces here shown are lymphatic rather than clefts produced by the inflation of the connective tissue the walls of which have become lined with proliferated lamellar corpuscles.

PATHOGENESIS.

(1) *Is the Gas secreted?*

The secretion of gas in the swim bladder of fish naturally suggests such a question, especially as this organ is developed from the alimentary canal, and in some fish retains its connexion with it, so that the gas, as is well known, can be liberated through the mouth: in others the sac is closed, the removal of the surplus gas being then effected by the sequestration of portion in the oval, a vascular sacculus which admits of being shut off from the rest by means of a sphincter, from which it is absorbed. Of the gases in the bladder, the O is secreted by the epithelial cells of a highly vascular specialized gland, the gas-gland, and is derived from the oxyhæmoglobin of the red blood cells: the N probably diffuses from the blood plasma into the cavity as a result of the unequalized nitrogen-tension. The gas-gland in Ophidium is a small, somewhat reniform organ, which projects into the lumen. Its minute structure is described and figured by Reis and Nussbaum.[1] The secreting cells, of which the cytoplasm contains a certain number of discrete gas vesicles, are of large size, and intimately connected with the capillaries, some of which penetrate the cells as deeply as their nuclei. As already stated, the cells which line the intestinal spaces have no intimate relation with capillaries, they present no special features, and no secreting function can be assigned to them.

Before leaving this subject the question may be put whether gas introduced into connective tissue is intussuscepted by its cells in the gaseous form. With a view of testing this the following observation was carried out: Nitrogen was injected beneath the loose skin of the back of a mouse through a fine needle. In order to render it sterile the gas was driven through a piece of glass tube filled with cotton wool which had been baked, the needle and rubber tube with which the glass was connected being boiled and dried immediately before use. In order to discover whether gas had been intussuscepted by the cells, the animal was killed with chloroform, and the examination made by peeling away films of the subcutaneous tissues bounding the cavity, and studying them immediately in 50 per cent. glycerine, beneath a cover glass. The animal was killed on the fourth day, the elevation over the back being still well pronounced, though slightly diminished. On slitting up the skin a capacious unilocular cavity, with a smooth interior, was opened; the delicate connective tissue bounding it was transparent, moist, and devoid of any congestion. The microscopic details were quite normal, the lamellar and other cells being clearly displayed: none of the cells contained any vesicles of the gas.

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[1] "Weitere Studien zur Kentniss des Baues und der Funktion der Gasdrüse und des Ovals in der Schwimmblase der Knochenfische (Ophididae, Percidae), *Anatomischer Anzeiger*, 1906, xxviii, pp. 177-191.

(2) *Is Gas liberated from the Tissue-lymph?*

Short of a proper secretion, however, there is the possibility of a more simple liberation of gas from the plasma in the tissues. In caisson disease, it will be recalled that the gases liberated in the blood, and from the lymph in the tissues around the capillaries, on rapid decompression, are those of the air dissolved in abnormal amount under the increased pressure to which the lungs and rest of the body have been subjected. Whilst it is true that no pressure approaching such occurs within the stomach or intestine under pathological distension, nevertheless the normal excretion of carbon dioxide from the human skin in cutaneous respiration proves that no such degree of decompression is necessary for the liberation of the gas from a *free surface*, and its diffusion into the surrounding air. In the human skin the ingress of atmospheric oxygen and the egress of carbon dioxide from the plasma probably take place only through the thinner epithelium lining the sweat coils; perhaps only through the intercellular cement. In the *Dublin Medical Journal* (January, 1841, p. 454), there is recounted a case in which gas was believed to have been visibly excreted from the skin whilst the body was submerged. It runs thus: "On the 12th of May, 1840, I (Sir Francis Smith) was consulted by a gentleman who told me that he often suffered from an enormous development of gas in the stomach, which he discharged by eructation; that he likewise occasionally experienced a development of gas from the bladder, and that his skin acted in a similar manner, as he had observed in the bath. On the morning of the 15th I found my patient in a bath at 79° F. of common river water (Seine). His heart, shoulders, abdomen, and hands were literally covered with minute bubbles of gas. On being questioned the attendant at the bath stated that he had never previously witnessed anything of the kind. On removing the hands and arms from the water the bubbles disappeared, but gradually returned on again immersing those parts. The bubbles were of the size of a pin's head; on wiping them off they disappeared, but gradually formed again. The experiments and observations continued nearly twenty minutes, and towards the end of the bath, the edges of the metallic reservoir were coated all round, but more particularly towards the upper end where the shoulders had been, for a depth of from 1 to 2 in. with small bubbles."

The appearance of gas bubbles upon any foreign body when immersed in aërated table water (water artificially charged with carbon dioxide) must be so familiar as to immediately suggest that this is the explanation of the phenomenon just referred to, the carbon dioxide in the latter case having been naturally held in solution. If the aërated water from a table syphon is allowed to stand until all effervescence has practically ceased, the tip of the finger, if vertically immersed in it, shortly becomes covered with minute bubbles; and this occurs as abundantly on the finger *nail* (even when placed uppermost) as elsewhere. Had this simple check of observing the finger nails been made in Smith's case, any doubt regarding the explanation of the observation could at once have been resolved. The liberation is determined not by the higher temperature of the finger, but by the roughness of what is submerged. If a perfectly clean and polished glass rod, on one side of which an area has been roughened by a file, is placed in, scarcely any gas bubbles are generated except over the roughened surface: here they form in abundance, and reappear as often as removed; the bubbles being at first of the most minute size, and appearing as well when this area is uppermost as when it is lowest: any bubbles arising from the water below, if allowed to ascend against the smooth parts of the rod, bound off without adhering to it. The abundant and continuous liberation of steam from boiling water following the addition of small fragments of earthenware, is a well known expedient in the chemical laboratory, which exemplifies the action of the same factor.

It is not a little curious, historically, that Hunter[1] refers to two observations, by others, similar to the later one of Smith's, and that he criticizes them in almost precisely the same manner, and discredits them on the same evidence as that just independently adduced. He observes, in proof, that it matters not what the substance is that is immersed, if it is but warmer than the water. The bubbles of air do not appear to arise entirely from the degree of warmth of the water, but also, in some measure, from a solid body being immersed in it; for simply heating the water to the same degree will not separate the air. And in a footnote he adds: "Dr. Pearson found that there was no appearance of bubbles during bathing in warm water that had been previously boiled so as to expel the air from it. The human body, when immersed in the bath at Buxton, and kept at rest in it for some time, was covered with bubbles, but these bubbles appeared in the same manner on any solid body that was placed in it."

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[1] Works, iv.

In cutaneous respiration, as in pulmonary, the tension of O in the atmosphere being greater than that in the blood, a passage from without inwards results; whereas the tension of CO_2 being greater in the blood than in the atmosphere, the passage of this gas takes place from within outwards. The elimination of CO_2 from the human skin is so small that, when the body is submerged, it would be dissolved without appearing in the gaseous form; and the higher the tension of CO_2 (if naturally present in the water) the less the amount that would leave the cutaneous vessels. In regard to intestinal respiration, the gas most diffusible through the wall is CO_2; then, far below, O and N. The relative solubilities of these gases in water are approximately 90 : 2 : 1. If air is introduced into the lumen of the intestine, its oxygen becomes diminished, its CO_2 increased, in accordance with the opposed tensions of the same gases in the tissue plasma or blood.[1] [The amount of CO_2 in solution in blood plasma, if any, is so minute as to be negligible; for practically none can be extracted from blood serum by means of the tonometer. As Dr. G. A. Buckmaster has shown, the transport-CO_2 of the blood is combined in some way with the hæmoglobin, which acts as the carrier not only of O but of CO_2 alternately.]

In cases of obstructive congestion of the intestine, the tension of CO_2 in the blood, one may suppose, would lead to the passage of the gas towards the lumen, and to its ultimate liberation, seeing that it would eventually escape the solvent action of the plasma in the intestinal parietes. The converse passage of CO_2 from the lumen into the intestinal wall will, naturally, occur should the bowel be filled with CO_2 at a higher tension than that in the blood or the tissue plasma;

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[1] G. Strassburg, *Pflüger's Archiv*, 1872, vi, p. 93. A. E. Boycott, *Journ. of Physiol.*, 1905, xxxii, p. 343.

and similarly of O and N, *mutatis mutandis*; for the passage occurs only between gases of the same kind.

These phenomena, however, are inapplicable to the case under consideration, since the gas, whatever it may be, is not disengaged from the *free*, inner surface, but lies within the walls of the intestine, where its liberation, after solution, would require an amount of decompression that is out of question.

The discharge of gas from the stomach in gout and hysteria was, in Hunter's opinion, indicative of a secretion or liberation from the blood. He writes (loc. cit., p. 97): "The stomach appears not only to be capable of generating an acid, but also to have the power of producing air; which last effect, I believe, arises from disease. When the gout falls on the stomach the quantity of air thrown up is often immense, and the same thing may be observed in some cases commonly called nervous. I am inclined to believe that the stomach has a power of forming air, or letting it loose, from the blood, by a kind of secretion."

This view has not been substantiated. The gastric pneumatosis of hysteria is regarded as due to aërophagy; and that of gout, to the liberation of gas from ingesta.

(3) *Mechanical Causation.*

The gas between the intestinal tissues may have come from the lumen of the stomach or of the intestine. In this connexion, reference may here be made to the alleged presence of gas in the peritoneal cavity apart from perforation of the stomach or intestine. Three examples of this have been recorded by Sir Rickman Godlee, in the *Transactions of the Clinical Society* (1877, x, p. 115):—

(1) The first was that of a man who had had dysentery, had suffered from syphilis, and was the subject of phthisis, and advanced amyloid disease of the liver accompanied with ascites. The enlarged liver could easily be felt, reaching down to within 1½ in. of the umbilicus, but the area corresponding to it had a tympanitic resonance except quite at the upper part. It was only on pressing the finger through this tympanitic region that the liver could be felt, and then a dull percussion note was obtained. At the autopsy no gut was found superficial to the liver. There were several ulcers in the colon above the sigmoid flexure, but no perforation. There is no mention in the notes of the state of the peritoneum, but the author states that he was nearly sure there was no recent peritonitis.

(2) A woman suffering from obstruction of the bowels from tumour, the obstruction having been complete for three weeks. The abdomen was much distended; and she suffered from paroxysmal pain. During the lumbar colotomy which was performed for the relief of the obstruction, a mass of fat was first taken for the colon; and then a protrusion of peritoneum distended with gas made its appearance in the wound. It was thought to be the colon, but as it did not look quite natural, another search was made. The peritoneum was punctured; and after the escape of a large quantity of gas and a little grumous fluid, the distension subsided, and the bowel was then easily found and opened. At the autopsy on the following day no perforation could be found, although it was carefully searched for. There was very early general peritonitis, and a little somewhat older, with some lymph around the cæcum corresponding to an ulcer as large as a threepenny-piece in the mucosa, filled with slough. The bowel at the seat of stricture was quite entire.

(3) A male, aged 72, suffering for three weeks from obstruction and much distension. At the lumbar colotomy, the first thing that presented in the wound was a knuckle of peritoneum distended with gas and containing a little clear fluid; the gut was found, and opened in the usual way. Some little care was needed to retain the peritoneum in the wound. The patient recovered, with only slight tenderness of the abdomen after the operation. Death occurred ten weeks later. No perforation could be found.

The author was inclined to view the pneumo-peritoneum as due to "osmosis"—i.e., to the passage of gas from the distended intestine, in a state of solution, through the wall, and its subsequent liberation at the peritoneal surface. Criticized from the physiological standpoint, already explained, such an hypothesis is untenable. The pneumo-peritoneum was in all three cases probably due to the rupture of subperitoneal collections of gas; these having formed in (1) in connexion with the ulceration of the colon; and in (2) with the sloughing ulcer of the cæcum: in the third, where death occurred ten weeks after the lumbar colotomy, the data are insufficient to justify a guess. An escape of gases into the intestinal wall from the lumen of the stomach or intestine under pressure, involves, it may safely be assumed, some form of trauma. This may be furnished by the presence of an ulcer; or arise *de novo* as a result of extreme distension. The passage of gas from retroperitoneal tissue into the peritoneal cavity will naturally be facilitated by the stomata present in the parietal serous membrane.

During the application of a purse-string suture to the distended colon, preparatory to the insertion of a Paul's tube, in cases of cancerous obstruction, a minute escape of gas not infrequently takes place from each puncture as the needle is carried horizontally through the wall. Mr. B. C. Maybury, who has often noticed this whilst operating, is confident that the needle does not penetrate beyond the submucosa; and that the gas does not come, therefore, from the lumen of the bowel, but lies in its wall. The phenomenon appears only in those cases where the distension is extreme.

The following observations made after death will further illustrate what is under consideration:—

Dr. C. R. Box tells us that he has on one or two occasions seen a local emphysematous or bullous condition of the intestinal wall brought about after death, at the site of an intestinal ulcer, from the forcible washing out of the gut with water admixed with air: and that something akin may happen when the stomach or bowel have been washed through, should the water be driven beneath the cut edge of the mucosa.[1] Quite recently a similar observation was made at St. Thomas's, by Dr. A. Mavrogordato, in a case of punctiform ulceration of Peyer's patches: after the intestine had been washed through from a pipe, and slit up, groups of water bullæ were found about the sites of the lesions.

Observation: October 2, 1918. There died suddenly a particularly well-developed man, from pulmonary thrombosis. The body was transferred to the cold chamber until 1 o'clock p.m. of October 2, and then to the mortuary. The autopsy was made on October 3, at 3 p.m. The lower part of the ileum, devoid of valvulæ conniventes, was thoroughly washed out; cut up in lengths, and forcibly inflated with a syringe fitted with a stopcock. Blebs of air appeared regularly along the *attached border;* and sometimes, in addition, beneath the peritoneum of the bowel in its immediate neighbourhood.

After a local damage to the intestinal mucosa, air can be readily forced, after death, into the other tunics.

Observation: A piece of human intestine, the lower end of the ileum, from the source already given, was everted, and a small oval area of the mucosa, 1 cm. in length, scraped away. It was then reverted, tied up, and connected with a syringe and stopcock. On inflation an opacity indicative of the escape of air, quickly arose at the injured spot. The opacity took the form of fine transverse lines, the air insinuating itself between the fibres of the circular muscular coat: as the escape continued the air appeared more superficially in coarser longitudinal lines (probably the subserous lymphatics) and blebs beneath the peritoneum. The chief collection of air, however, was along the attached border, where the wall is unsupported by peritoneum. On slitting up the intestine, no air was found beneath the mucosa. In another observation, the air travelled in the same way, from the spot from which a small area of the mucosa had been scraped off, between the fibres of the transverse muscular coat, both over, and on either side of, the lesion, whence it extended subperitoneally towards the attached border.

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[1] "Post-mortem Manual," 1910, 1st ed. p. 156.

A similar result ensues if a fine subcutaneous injection needle connected up with a rubber bellows, is run horizontally into the muscular wall, in the long axis of the bowel: air is driven between the circular muscle fibres; and sometimes, also, lengthwise, in coarser lines, beneath the serosa. If the needle is inserted near the attached border, the serosa rises in wider blebs which reach the latter. The position, however, in which inflation is most readily produced is the submucous tissue. If the bowel be slit up, and laid on the front of the finger, with the mucosa uppermost, the needle can, with care, be passed into the submucosa without perforating the muscularis. When the air is driven from the bellows, the mucous membrane is immediately raised over an extensive area, from which it can be easily shifted onwards with slight pressure. The absence of submucous inflation when the bowel is distended after injury to the mucosa is attributable to the fact that the pressure within the lumen forces the mucosa against the muscularis; when the entry takes place in the axis of the undistended bowel, a submucous pneumatosis is readily brought about.

Better than observations made after death, however, is the following which was carried out in the living subject. A syringe was filled from a reservoir of nitrogen, and connected up with a glass tube containing cotton wool sterilized by heat, and this with a fine subcutaneous needle. In a man upon whom a colostomy was to be performed, a loop of the pelvic colon was brought out through an abdominal incision, and secured in the wound in the usual manner. The bowel was then held at one spot, in a longitudinal fold (like the skin for a subcutaneous injection) and the needle inserted into the submucosa from the outer, intact surface. Some of the N was then driven from the syringe, with the immediate result that a considerable area of the bowel swelled up, and became whiter than the rest, from inflation of the submucous tissue. After a minute or so, small blebs of the gas made their appearance beneath the peritoneum.

In cases of extreme intestinal distension, the cæcum has been found, when exposed during life, to present gaping rents in the peritoneum, as much as 2·5 cm. (1 in.) in length: and some of these have been seen to form whilst the bowel was under observation (W. H. C. Romanis). This is direct proof that trauma of the intestinal wall may result from over distension. And, again, in reducing ileo-cæcal intussusceptions after laparotomy, rupture of the peritoneum investing the cæcum may be unavoidably produced towards the close of the manipulation, when the cæcum becomes supremely distended by the included bowel. As suggested by the following experiment, the actual site of the mucosal perforation in intestinal tympanites, may be the crypts, which give way under distension:—

Observation: A piece of the fresh small intestine of a young cat was kept in warm water until rigor mortis had passed off. The mucosa was cleaned by repeatedly filling the bowel with water, and kneading it whilst filled. It was then kept firmly distended with carmine gelatine under pressure of a syringe, whilst immersed in warm water, and kneaded, for fifteen minutes; after this, the gut was tied up, suspended in cold water, and finally in Kaiserling's formol solution. Microscopic examination was made upon transverse sections cut by the freezing method, and mounted in Farrant's medium, so that no shrinkage took place, the use of alcohol having been throughout excluded. The crypts proved to be, all of them, distended with the gelatine: their outline was somewhat undulatory, apparently from an increase in length hindered by the limitation at their deeper ends where they abut upon a somewhat dense submucosa of connective tissue. The jelly is sharply circumscribed and clearly not extravasated, although the epithelial lining of the crypts is mostly detached; here and there, nevertheless, it has escaped to a small extent into the mucous and submucous coats.

In the older literature there are to be found two examples of enphysema of the intestinal wall, but in neither can the effects of post-mortem decomposition be excluded in their causation. And the same uncertainty applies to the case of emphysema of the wall of the *stomach* occurring about the site of a simple ulcer, mentioned by Brouardel.[1] The patient who was convalescent, was suddenly seized, after eating an apple tart, with vertigo; fell down, and died shortly after being put to bed. Post-mortem: The "cicatrix" was found torn, and the "organ was distended with gases which had penetrated beneath the mucous membrane of the stomach, so that the walls seemed to be inflated." The sudden onset of symptoms shows that the unhealed ulcer perforated in the usual manner—viz., from the partial detachment of its margin, and not from the ante-mortem formation of gas.

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[1] "Death and Sudden Death," 2nd ed., p. 252.

The two earlier examples of *intestinal* emphysema come from Haller and Combalousier (Frank, loc. cit.). A reference to the original accounts enables us to give the following details: Haller,[1] "Pathological

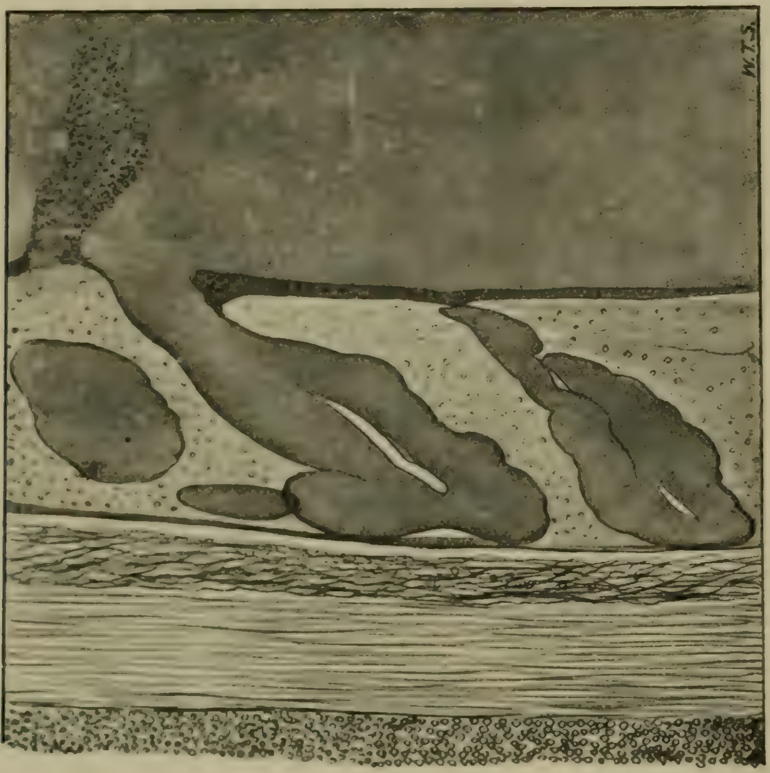

FIG. 7.

A horizontal section of the small intestine of a cat, fully distended with carmine gelatine, showing the entry of the injection into the crypts. Beneath the crypts lies the connective tissue of the submucosa, and beneath this, the transverse and longitudinal muscular coats. In the gelatine occupying the lumen there is an upstanding villus. ($\frac{2}{3}$ obj.)

Figurae explicatio.

Sectio microscopica intestini tenuis (*Felis catus*). Intestinum perdistentum erat collâ calidâ injectâ. Injectionis materies in cryptas glandulares introivit. ($\frac{2}{3}$ obj.)

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[1] This, one of the few of Haller's works not published in Latin, apparently owes its English to the fact that the author was President of his Britannic Majesty's University at Göttingen.

Observations," 1756, London. Observation 26: Upon a case of tympanites in a woman, in the year 1751. The intestine was distended to an enormous size, and the air had raised vesicles on the outside between the muscular coat and the external membrane, which when opened gave an intolerable odour. He remarks that air might conceivably reach the abdominal cavity by rupture of the vesicles In this case the gas was probably forced through lesions in the intestinal wall occasioned by the pressure within the lumen; but this pressure would be still further increased after death; and a full proof that the emphysema was present during life, is wanting.

The second is mentioned by Combalousier in his erudite work, "Pneumato-pathologia seu Tractatus de flatulentis humani corporis affectibus," Paris, 1747. Combalousier, however, merely cites the observation, which appeared anonymously (I. G. D.) in the "Commentarii Academiae Scientiarium Petropolitanae" (St. Petersburg), tomus V, p. 213 (1730-31). The distribution of the gas in this case was both submucous and subperitoneal. The title of the communication is: "Aer intestinorum tam sub extima quam intima tunica inclusus."

"Inverso intestino, super interiore facie . . . ejusmodi tumores seu elevationes pari numero forma et amplitudine, qua in exteriore superficie, conspicuae erant; earum enim nonnullae contractiores, aliae circulum efformantes et ex earum numero nonnullae adeo protuberantes ut fere cavum canalis obturarent."

The author furnishes no details of an autopsy, nor does he definitely state that the intestine was from the human subject. The paper that immediately follows—by the same author, in fact—deals with a subject of comparative anatomy: "De Quadrupede volatili Russiae observationes." A third specimen of about the same date is that in Ruysch's Museum.[1] It is thus described with an illustration, under No. 26: "Hominis intestini jejuni portio. Lit. A, tumorem designat qui a flatu subortus est, postquam exterior tunica leviter fuit laesa."

(4) *Is the Gas of Bacterial Origin?*

Although the intestine presented no congestion or other signs of disease, it is nevertheless conceivable that the access of a coliform bacillus, or of a highly attenuated strain of *Bacillus aërogenes* to the intestinal wall might have resulted in the production of gas *in loco*.

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[1] Frederici Ruyschii: Opera. Amsterdam, 1737. Musaeum Anatomicum Ruyschianum, sive Catalogus Rariorum quae in Musaeo authoris asservantur.

The examination of a series of sections stained with carbol thionine, failed to reveal any bacteria either in the walls of the cysts, or in the tissue around; ignoring the spurious elements resulting from the escape of granules from mast cells, readily differentiated by their variations in size, and immediate distribution about such cells. In the microscopic sections, again, there is a complete absence of the small-celled infiltration which is so conspicuous in the second case to be presently described.

To sum up; the balance of evidence is slightly in favour of a mechanical causation—an effusion of gas, i.e., from the lumen of the alimentary canal, through a rupture, or an ulcer, of the mucosa. Over-distension of the small intestine cannot have been the source of injury, seeing that the obstruction—viz., the pyloric stricture, lay *above* the site of the emphysema, and that there was no second obstruction below: the absence of the latter being comfirmed by the fact that pursuant to the gastro-enterostomy, no symptoms of any kind whatsoever persisted. When exposed, moreover, at the operation, the small intestine was quite normal in respect of tension. The condition may be explained, perhaps, as due to the forcible displacement of air and gas from the dilated stomach, presumably through an ulcer which lay immediately beyond the pylorus; the gas passing first into the submucosa, and thence through the muscular wall into the subperitoneal tissue, its wide extent along the bowel being facilitated by the intestinal peristalsis. That the lavage of the stomach, for so long practised by the patient, was a source of injury to the gastric mucosa is very unlikely; not overlooking the fact established by direct observation, that the mucosa of the human intestine and stomach, with their muscular and peritoneal coats, are not only devoid of common sensation, but insensible to cutting or to the thermocautery.[1] The lavage was carried out with a soft rubber tube.

On this view there is one detail calling for notice—viz., the absence of blebs from the duodenum and first part of the jejunum, where the latter was opened in making the gastro-jejunostomy. The explanation of this may lie in the remarkable activity of the peristalsis peculiar to the duodenum: at such periods the gas in this part of the intestinal wall would be shifted onwards into that beyond.

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[1] Lennander, "Observations on the Sensibility of the Abdominal Cavity," English translation, by A. E. Barker, 1908.

The **second example** of intestinal emphysema which has fallen under our notice, concerns a woman, aged 40, who was operated upon (by Mr. Nitch) on May 27, 1919, for obscure abdominal symptoms referable to the right iliac region. She was quite well until twelve days previously, when she was suddenly seized with acute colicky pain in the right iliac fossa. The pain subsided in a few hours, but recurred a week later, and gradually became more intense until she was operated upon, on May 27. There was no vomiting, and only slight constipation. Upon examination, a tender, elongated swelling was found which stiffened and relaxed every few minutes, so as to suggest an intussusception. There were no signs of peritonitis; the temperature was normal; pulse, 72. At the operation, the walls of the cæcum and ascending colon were found inflamed, thickened, and crepitant on pressure; beads of gas, moreover, were freely distributed in the surrounding connective tissue, and in some of the appendices epiploicæ. The vermiform appendix, and termination of the ileum, were unaffected. There were several calcified tuberculous lymphatic glands in the ileal mesentery; no tubercles were seen on the peritoneum. After the excision of the cæcum with the ascending colon, and a third of the transverse, &c., the continuity of the bowel was restored by lateral ileo-transverse colostomy; the abdomen being finally closed, without drainage. Recovery was rapid and uneventful.

The parts removed comprise the cæcum with its appendix, and most of the ascending colon, together with the termination of the ileum. On slitting up the cæcum its walls were found thickened throughout from submucous emphysema, the ileo-cæcal valve being also involved; the mucosa of the latter was deeply congested, but without ulceration. There was a second patch of congestion, about the size of a sixpence, at the upper part of the cæcum. The connective tissue and appertaining fat about the cæcum and ascending colon, contained large numbers of gas blebs, ranging from a minute size to that of a pea. After the parts had been hardened in formol solution, the examination was completed. The termination of the small intestine was divided longitudinally, the incision being carried through the valve into the cæcum; it is remarkably contracted, its mucosa being thrown into regular, closely set, circular folds like valvulae conniventes; the production of circular folds, indicating a close contraction in the *longer* axis of the bowel, as well as in the transverse. Its walls are quite free of gas; no ulceration is discoverable: its interior contained a small amount of green, bile-stained mucus. On longitudinally bisecting the ascending colon, a remarkable condition presented itself. The mucous membrane is raised in prominent, somewhat hemispherical elevations by a diffuse submucous emphysema, the tissue being like a sponge, or a section of lung. The elevations are so prominent, and interdigitate so compactly, as to block the lumen. The line of the muscularis is straight and intact, and the mucous membrane itself is readily traceable over the cavernous areas resulting from the pneumatosis. The cæcum is similarly, though less

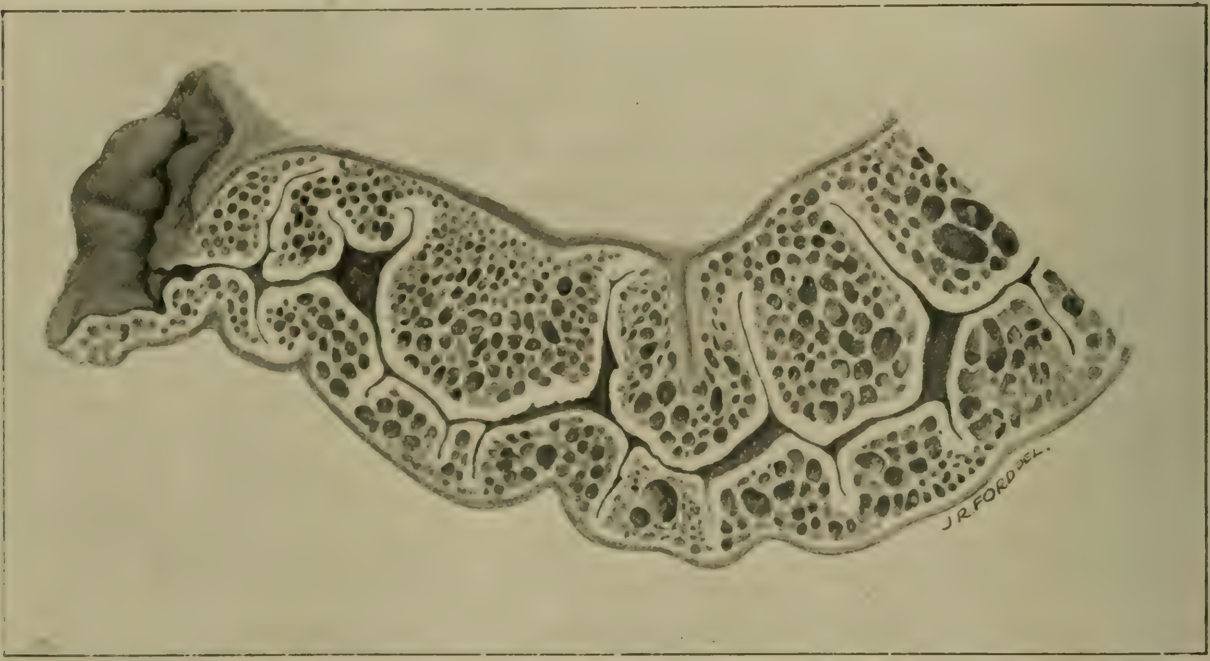

Fig. 8.

Portion of the ascending colon excised with the cæcum, during life, from the second case of emphysema of the intestinal wall; as seen in longitudinal section. The mucous membrane is thrown into a series of prominent, interdigitating elevations, so as to obstruct the lumen, as a result of diffuse emphysema of the submucous coat. The emphysematous tissue is so uniformly and finely inflated as almost to resemble lung. The cæcum was similarly affected, but to a less degree. The small intestine was uninvolved. No obstruction was present either on the proximal or distal side of the affected area; nor was any ulceration discoverable in the mucosa. The portion shown is the most distal part of that excised. (Natural size.)

Figurae explicatio.

Intestini parietum emphysema; exemplum secundum. Coli ascendentis portio in longitudinem secta. Membrana mucosa in eminentias rotundas, quibus intestini lumen valde deminuitur, elevatur. Eminentiae vesiculis parvis ubique constructae sunt (sicut pulmonis textura) aere generato in tunicâ submucosâ. Caecum similiter, in gradu autem minore affectum fuit. Intestini tenuis terminatio valde contracta sed aliter normalis fuit.

Nihil obstructionis ultra utramque extremitatem partis affectae adfuit; nec ulcus alicubi in membranâ mucosâ inventum est. Appendix vermiformis excusari potest; lumen totum obliteratum est. (Magnitudinis naturalis.)

affected, the elevation of the mucosa being uniform in degree, and so general that the lumen is but slightly diminished. The valve is involved in the same manner; but the condition ceases abruptly at the small intestine. The vermiform appendix, lastly, is firm, and below the normal in diameter: on longitudinal bisection, it proved to be solid throughout.

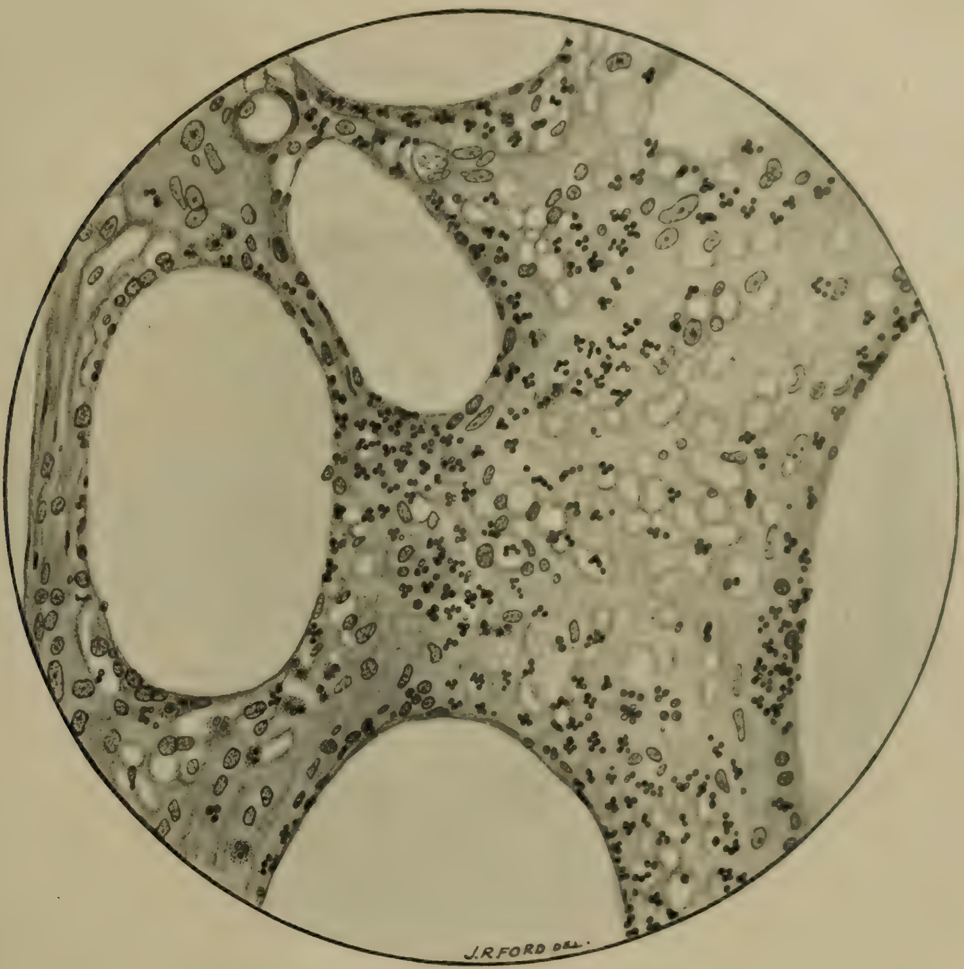

FIG. 9.

A microscopic section of the emphysematous colon from Case 2, showing the spaces in the submucosa. The septa are thickly infiltrated with polymorphs. In the earlier stages the formation of gas is accompanied with an exudation of serum, as may be recognized in the thickest of the trabeculæ. The section is from the neighbourhood of the most distal portion. ($\frac{1}{6}$ obj.)

Figurae explicatio.

Sectio microscopica intestini emphysematosi praecedentis, lacunas sphaericas in membranâ submucosâ monstrans quarum parietes cellulis polymorphonucleatis sparguntur. Aeris origo cum seri exsudatione jungitur ut in trabeculâ crassiori apparet. ($\frac{1}{6}$ obj.)

The microscopic examination of the wall of the ascending colon in the neighbourhood of the distal end of the emphysematous portion, shows that the mucosa with its glandular structures, as well as the muscularis, are unaffected. The vacuolation is limited to the submucous connective tissue. The smaller spaces are partly filled with homogeneous exudate containing polymorphs, large numbers of which infiltrate the septa between the lacunæ. The spaces have no differentiated lining. Sections prepared from the emphysematous ileocæcal valve exhibit similar appearances; in these there are conspicuous numbers of multinuclear giant cells in the tissue bounding the spaces.

In this case there was no obstruction, either distal or proximal to the affected area, which might have resulted in hyperdistension and trauma of the mucosa; nor was there any ulcer the base of which might have given way and allowed of the effusion of gas. The emphysema cannot but be ascribed to an infection of the wall of the cæcum with a gas-producing bacillus, notwithstanding the failure to demonstrate the presence of such in histological sections, either in the exudate or in the cells. The histological picture is that of a somewhat acute infective process which involves not only the submucosa, but in places, also, the muscularis. There are no vacuoles in the giant cells to suggest these are gas-secreting; and it may be observed that giant-cells are not present in the proper gas-gland of the swim-bladder of fish.

It must be borne in mind that the ease with which gas is shifted onwards in the submucosa, and from the submucosa into the subperitoneal tissue, may lead to its presence far away from a site of bacterial infection, and so obscure the pathogenesis of the emphysema. Such an occurrence is well illustrated in gas gangrene, where the subcutaneous emphysema is due, in the first place, to the passage of gas from the infected muscles through the perforations in the deep fascia which transmit vessels to the skin. The bacillus may have been of the coliform group, as in certain of the cases of intestinal emphysema described in the human subject (e.g., that by Camargo, 1891: a man, aged 60, who died from pulmonary tuberculosis) and in swine: or it may have been a highly attenuated strain of *Bacillus aërogenes*. Towards the close of the war in France there occurred an interesting case, under Captain Vaucher, which was communicated to us by Miss Muriel Robertson. A soldier received a trifling injury to the lower part of the leg; and without any change in the wound, or any general disturbance, the limb commenced to swell, and became emphysematous, the emphysema extending at last to the thigh. On aspiration of the emphysematous tissue, *Bacillus aërogenes* was cultivated, its diagnosis being authenticated by the recognized tests.

Mr. W. H. Battle has furnished us with a photograph by Dr. F. Bryan, showing a closely similar, external emphysema of the subperitoneal connective tissue of the pelvic colon and appendices epiploicæ. The photograph was taken after death, the parts being exposed *in situ.* There was a perforation of the rectum, consequent probably upon an injury produced by an enema tube: the patient was an inmate of a lunatic asylum. The autopsy was made in cold weather, eighteen hours after death. In the same asylum, a second, similar case was observed, following the administration of an enema by the same attendant. How far the emphysema here was due to the expulsion of gas from the lumen of the damaged bowel, how far to the bacterial infection of the injury, it is impossible to determine.

Of the different examples of emphysema and gas-cysts of the human intestine (and a reference to the literature will show that they are not a few)[1] the pathogenesis of each would need discussing on its own merits. In some the emphysema results from trauma of the mucosa caused by over-distension, the gas being furnished by that within the lumen of the intestine, augmented, it may be, by that produced *in loco* from a secondary infection of the lesion. In others, the emphysema may arise, apart from over-distension, as a result of local bacterial infection; associated, or not, with the presence of an ulcer. And in a third set, it may arise from the forcible introduction of gas from the lumen, through the base of an ulcer; increased, it may be, by an ensuing infection of the intestinal wall.

In the particular case described by the authors referred to,[2] it is of interest to observe that the condition involved the small intestine, and that the patient was suffering from pyloric stenosis accompanied with secondary dilatation and hypertrophy of the stomach, for which posterior gastro-enterostomy was carried out. Death occurred shortly after the operation, from hæmorrhage from the gastric ulcer with which the stenosis was associated. No bacteria were cultivated from the cysts, and none were demonstrated either within the cysts, or in their walls. The conclusion of the authors was, that there was no positive evidence that the gas production was the immediate result of bacterial action.

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[1] T. Shennan and D. P. D. Wilkie, *Journ. Path.*, xiv, 1910.

[2] Loc. cit.

Intestinal Emphysema in Swine.

And not to pursue the subject further, the same condition in swine, since it was first recorded by Hunter, has a literature of its own. This is fully given, up to 1906, by Alfred Jaeger.[1] In the specimen (small gut) described by the latter, some of the gas certainly occupies lymphatics, as shown by the tubular form of the spaces and the presence of a differentiated wall. The author figures, in addition, cell groups in which multinucleated elements are conspicuous. The mesenteric glands likewise contained gas which had found its way into the lymph sinuses. The pathogenesis was bacterial. The bacillus cultivated from the walls of the spaces was (as in three further cases examined by the same author) an aëro-anaërobic, Gram-negative, gas-forming, short, stout bacillus of the coliform group: the cultures were made from three to five hours after the animals had been killed. Intestinal emphysema has been observed, also, in a few cases in, apparently sound, sheep. The Hunterian specimens (which escaped Jaeger's notice) are best known through the reference to them in Sir James Paget's "Surgical Pathology," third edition. In the new catalogue of the Pathological Section of the Museum of the Royal College of Surgeons,[2] they are thus described:—

1141·1. A portion of the rectum of a hog, of which the peritoneal coat is in many places, and especially by the sides of the meso-rectum, covered with clusters of thinly walled cysts, many of which are pedunculated; and all of which contained gas.

This preparation is engraved in Plate 37 of Hunter's works, and is described as: "A portion of intestine of a hog, the peritoneal coat of which is covered in several places with small pellucid cysts containing air. It was sent to me by my friend, Mr. Jenner,[3] surgeon, at Berkeley, who informed me that this appearance is found very frequently upon the intestines of hogs that are killed in the summer months." And, in the "Observations on Digestion,"[1] Hunter says (to illustrate the fact "that air is either formed from the blood, or let loose by some action of the vessels, both naturally and from disease"): "I have a piece of the intestine of a hog which has a number of air-bladders in it. Mr. Cavendish was so kind as to examine this air, and he found 'it contained a little fixed air; and the remainder not at all inflammable, and almost completely phlogisticated.'"

---

[1] "Das Intestinal Emphysema der Suiden," *Archiv. f. Tierheilkunde*, xxxii, 1906, p. 410.

[2] Descriptive Catalogue of the Pathological Specimens contained in the Museum of the Royal College of Surgeons of England. New edition, by Samuel G. Shattock, with the assistance of Cecil F. Beadles, October, 1911.

[3] Edward Jenner: the discoverer of vaccination.

Of this last quotation it may be stated that "fixed air" denotes carbon dioxide; "inflammable air," hydrogen; and "phlogisticated air" is nitrogen.

The value of the chemical data, however, is marred by the possibility of some interchange having taken place between the gases within the cysts and those of the air, seeing that the transport of the material at that period would have occupied a considerable number of hours.

No. 1142·1, is a similar portion of intestine, with cysts which contained gas, dried.

De exemplis duobus intestinorum emphysematis, aere intra parietes intestini incluso.

Disquisitionis summa.

In exemplo primo laesio inexpectate reperta est dum operatio chirurgica (gastro-enterostomia) conficiebatur pylori adversus stricturam cum ulcere simplici sociatam. Ventriculus flatu distentus erat plurimos per annos, et ad ilii cristam nuper extendebat. Supra intestinum tenue totum, duodeno excluso, sparsae sunt aeris bullae quae sub tunicâ peritoneali plerumque projectae sunt.

Portio parva ex intestino affecto excisa est ut laesio accurate indagaretur. In hâc portione bullae sive cystes sub membranâ mucosâ solum jacere inveniuntur; endothelii cellulis bullae intus tectae sunt.

Laesionis pathogenesis: Bacillorum aerogenium actio excludi potest scrutatione microscopicâ, sectionibus secundum artem tinctis. Excludi potest quoque aeris secretio intestini in parietibus. Vix dubitari potest quin laesio causata sit aere propulso de ventriculo inflato ulceris per basem quod juxta pylori stricturam positum est, intestini peristalse in aerem promovendo adjuvante.

In exemplo secundo excisum est caecum cum colo ascendente et extremitate intestini tenuis, adversus, ut putabatur, intestini intus-

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[1] "Works," iv, p. 98.

susceptionem. Partibus excisis tunica coli mucosa in eminentias rotundas quibus intestini lumen valde deminuitur, elevari reperta est. Eminentiae vesiculis parvis ubique constructae sunt, tanquam pulmo, aere generato in tunicâ submucosâ. Caecum similiter, in gradu autem minore, affectum fuit; intestini tenuis terminatio valde contracta sed aliter normalis.

Nihil obstructionis ultra utramque extremitatem partis affectae adfuit; nec ulcus alicubi in membranâ mucosâ inventum est. Appendix vermiformis excusari potest; lumen totum obliteratum est. Aeris generatio hic ascribi debet parietibus intestini infectis, ut inflammationis acutae indicant nota. Dolore excluso aegra vix patiebatur; atque intestino ablato celeriter sanata est.

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Section of Psychiatry.

President—Dr. WILLIAM McDOUGALL, F.R.S.

PRESIDENT'S ADDRESS.

The Present Position in Clinical Psychology.[1]

By WILLIAM McDOUGALL, Major R.A.M.C.(Temp.), M.B., F.R.S.

IN choosing a subject for this address, I have felt at liberty to go outside the boundary of *psychiatry*, and I propose to put before you a slight sketch of the present position in *clinical psychology*. First, it is necessary to explain what I intend to denote by this term. It may be said that there is not and cannot be any branch or section of psychology that can properly be so called; for the clinician necessarily deals with his patient as an entire organism and cannot, in considering his mental life, abstract from any one part or function of the mind, to concentrate his attention upon another: his psychology therefore must be concrete and must deal with the mind as a whole. This is true, and it follows from this truth that, when our knowledge of the human mind shall have become an adequate and well-established science, that science must be the theoretic basis for all who are practically concerned with the working of the mind, whether they are chiefly and immediately concerned with the normal mind or with minds in disorder.

But, as I shall presently show, it is just because we have hitherto had no such psychology, that there has been growing up of late years a specialized form of mental science which may conveniently be designated *clinical psychology*. There can, I think, be little doubt that a century hence the present time will be held to be remarkable for the great advances made in our understanding of the mind, and it will be recognized with gratitude that clinicians have played a great and leading part in this achievement. My purpose is to attempt a rough sketch of the way in which this achievement of the clinical psychologists will appear to the historian of science in that future age.

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[1] At a meeting of the Section, held November 19, 1918.

In order to understand the rise of clinical psychology as a semi-independent body of thought, we must glance at the state of academic psychology in the later decades of last century. There is some foundation for the jibe that there were then as many psychologies as psychologists; yet there were certain doctrines which, especially in the psychologies that claimed to be scientific rather than philosophical, dominated the scene.

The chief of these were: (1) *Atomism,* or *Sensationism;* (2) *Associationism;* (3) *Hedonism.*

Sensationism, the theory that all mental states, broadly spoken of as *presentations* or *ideas,* are aggregates formed by the compounding or clustering together of smaller fragments of conscious stuff, the elementary sensations; one idea differing from another merely in the number and variety of the units of sensation combined in it (hence the name *mind-dust theory*).

Associationism, the theory that all this compounding and clustering of units to form ideas, as well as all the succession and interplay of ideas, was ruled by the one great principle of *association.*

These two great principles were natural complements, and, therefore, were almost inevitably and everywhere combined. This combination was very widely accepted, owing not only to the seductive simplicity of the notion, but still more perhaps to the fact that it lent itself to combination with the increasing knowledge of the structure of the brain, to form a purely mechanical and materialistic theory of mental life. For the mental elements were regarded as being functions of the brain-elements or cells, as the sound of a plucked string is a function of the string; and the ideas or clusters of elements were likened to the chord heard when many strings are plucked or sounded together. Association was a function of the connexions between brain-cells; and all the play of mental life was but a matter of the ringing up of brain-cells and groups of cells by the spreading of the nervous impulse from group to group, according to the simple principles of mechanical association.

British thinkers, Locke, Hartley, the Mills, Bain and Herbert Spencer, to mention only a few of the most distinguished, were chiefly responsible for the immense success of these two principles.

To some thinkers these two principles alone seemed sufficient to account for all thought and all action; for *to will* was to have an idea of an action or movement, and these ideas of movement were, like all others, subject only to the great law of association. This was the theory of ideo-motor action, dearly beloved of so many of our French colleagues, and unduly emphasized by many of them. But others could not overlook the fact that men commonly act, not merely because an idea of action comes into their minds, but because they have a purpose, seek some end, or strive to achieve some effect; and, looking round for some formula to define that end, they said—It is *pleasure!* In acting, in seeking, in striving, men, they said, are always moved by the desire of pleasure. There you have the third great principle of *Hedonism.*

The psychologies which did not base themselves upon these principles were in the main highly metaphysical and not such as to engage the attention of physicians struggling with the problems of mental and nervous disorder. And so we find that these physicians adopted, almost without exception, the mechanistic psychology founded on Atomism, Association, and Hedonism.

This psychology, however, was wholly inadequate to the needs of psychiatrists. Its specious principles afforded little or no help when brought to the practical test of use in the interpretation of mental disorder.

And the natural consequence of its acceptance by psychiatrists was that those among them who were moved to research devoted themselves almost wholly to the attempt to discover the material basis, the neuropathology, of mental disease; this tendency being strongest where the mechanistic psychology was best established—namely, in England and Scotland. While the practical physician used the psychology of common sense and common speech, supplemented by his own intuition and large experience of men; a condition of affairs illustrated by the majority of the older text-books still in use.

I will further illustrate the position by reference to the writings of three leaders of psychological medicine, in Germany, France, and England respectively.

Professor Ziehen, whose works have enjoyed a wide circulation, represents the pure principles of mechanistic materialistic psychology based on the three principles mentioned above. His psychology claims to be a physiological psychology; in reality it is a speculative and highly dubious brain-physiology which for psychiatry is utterly sterile. Psychology of this sort seemed at one time to have achieved a triumph in its interpretation of the varieties of aphasia, but it is, I think, now generally recognized that this triumph was illusory, and that in the main it obscured and distorted the facts.

Professor Pierre Janet may justly claim to be the father or founder of clinical psychology. Starting with the principles of the mechanistic psychology, and, like other French writers, attaching great importance to the notion of ideo-motor action, he greatly developed the conception of *mental dissociation.* But valuable as was this contribution, his work would have remained on the purely descriptive plane, had he not broken away from the mechanistic psychology by introducing a new conception quite incompatible with it—namely, he conceived the mind to be pervaded by a synthetic energy, variable in quantity, whose function is to hold together in one stream of consciousness the various sensory elements, and in defect of which dissociation of consciousness into partial streams occurs.

In this country, the transition from old to new doctrine which I am attempting to sketch is illustrated in the most striking way by the work of Dr. C. Mercier. This brilliant writer, after having expounded the mechanistic psychology, with great force and confidence, has made the discovery that in presence of all problems of action it leaves us utterly helpless. Thereupon, instead of undertaking a radical revision of his psychology, he announces our need of a new and distinct science —namely, a science of conduct (which he proposes to call *praxiology*)— and writes a new volume to lay the foundations of this much needed science. No happier illustration of the inadequacy and sterility of the mechanistic psychology could be found. In taking this course Dr. Mercier was unconsciously following the example of John Stuart Mill, who began by adopting and expounding the purely mechanistic psychology of his father; and then, discovering, like Dr. Mercier, that it threw no light on problems of conduct and of character, sketched out a new science to fill this gap, proposing to call it *Ethology.* Thus does history repeat itself even in the realm of science.

These three thinkers I have cited fairly represent the many others who have vainly striven to bring the mechanistic psychology to the aid of medicine. No wonder, then, that others have thrown aside all academic psychology in approaching the problems of the disordered mind; and it is perhaps well that they have done so; for their relative freedom from the paralysing shackles of the mechanistic psychology has enabled them to make progress; but their repudiation of all academic psychology has inevitably resulted in those peculiarities of the clinical psychology of our time which mark it off from the main stream of psychological tradition and development.

This method of approach and these consequences are best illustrated by the work of Professor S. Freud, who, whatever verdict may ultimately be passed on his psycho-therapeutic methods, will certainly rank as one who has given a great impulse to psychological inquiry. Freud's psychological work may be said, from the logical point of view, to have begun from the wrong end. Without any preliminary attempt to consider first principles of mental life, to analyse consciousness, or even to define the terms which he uses, this daring and original inquirer has wrestled at first hand with the problems of conduct and especially with the problems of disordered conduct as presented to him by his patients in all their concreteness and complexity. Thus approaching, he has been deeply impressed by the great fact that much of human conduct, both normal and abnormal, proceeds not from consciously reasoned motives nor from any chain of association of clear ideas, but from a great impelling force that works within us, expressing itself only very obscurely in consciousness as vague feeling and uneasiness. This he has recognized as the sexual impulse; and, having been deeply impressed by the far-reaching effects of this upon conduct, and by the obscure and devious modes of its operation, he has gone on to bring under the same heading whatever other forces of a similar nature he has seemed to detect as co-operating with and subserving it, or which the vagueness of common speech seems in any way to to connect with it. In this way, in his reaction from the mechanistic psychology, he has brought to light two great allied facts: (1) The impulsive, demoniac, illogical nature of much of human thought and conduct; (2) the very partial and inadequate way in which consciousness or self-consciousness reflects or represents the workings of this impulsive force. Freud's insistence on these two facts is his fundamental contribution to psychology; and it is the recognition and emphasis of them, thanks largely to his labours, that is the key-note of clinical psychology at the present time.

Freud's development of these two truths has been marred by several errors: First, his attribution to the sexual impulse of much of conduct that is not properly so attributable, and his consequent exaggeration of the rôle of sex; secondly, he has not wholly freed himself from the errors of the mechanistic psychology, in spite of his detachment from tradition, so natural are these errors to the scientific mind; two especially he has retained—(*a*) instead of repudiating the mechanistic determinism, he claims that he has for the first time established this principle in psychology; (*b*) instead of repudiating *Hedonism* he has made it his own and attempted to combine it with his recognition of the impulsive nature of conduct, as what he calls the *pleasure principle*, in a very confusing way that largely vitiates his thinking. A third great blemish is, that, having repudiated the traditional terminology of psychology and having neglected to define his own terms by careful analysis, his terminology is often obscure and misleading, and, as a further consequence, the large unanalysed conceptions with which he operates tend to become anthropomorphic agencies—the unconscious, the censor, the foreconscious, &c.

But in spite of these large blemishes and beyond the two fundamental principles we may, I think, see in his work permanent contributions to psychology which are of especial value to clinical psychology and are playing a great part in its development. Notably (1) the conception of active continued repression of distressing memories; a conception distinct from and much more fertile than the dissociation of Janet; (2) the conception of conflict in the mind going on below the threshold of consciousness and capable of giving rise to disorder of thought and conduct; (3) the symbolical significance of some dreams and of some forms of waking thought and conduct, and the value of these as indicators of conflict and repression; (4) the conception of the "affect" as a quantity of energy that attaches to ideas and gives them their impulsive force in the determination of thought and conduct.

Let us now glance at the way in which others have contributed to the further development of these lines of thought. I refer first to Adler, who, working by methods similar to Freud's, has diverged widely from him. His chief contribution has been to secure recognition by clinical psychology of two great impulses which seem to have escaped the notice of Freud. He has recognized the great part in human life of an impulse of self-assertion, and of one of only less importance, an impulse of self-abasement or submission; and, applying to these what may perhaps without impropriety be called the Freudian method in psychology, he has assigned them an immense rôle, and seeks to show that their distorted working is the source of all the neuroses, just as Freud finds that source in the sex-impulse. And, though he has without doubt exaggerated their rôle in the neuroses, we must forgive this natural exaggeration in gratefully recognizing that he has secured recognition by clinical psychology of these two important impulses.

An English clinician has in a similar way secured recognition for another great impulse. Mr. W. Trotter has discovered the gregarious impulse and, in a brilliant and persuasive little book, has treated it by the *Freudian method*, that is to say, postulating this impulse, without first stopping to inquire—What is its nature? What are the limits and scope of its action? but, sweeping into its province whatever human activities are social or in any way dependent upon or related to the social groupings of mankind, he has made it appear as the mainspring of well-nigh all human activity, normal and pathological.

An American clinician has performed a similar service in regard to yet another fundamental impulse of the human mind. Dr. Boris Sidis has, by applying the Freudian method, sought to show that *fear* is the source of all the psychoneuroses, all those troubles of thought and conduct which Freud attributes to the sex-impulse, and Adler to the self-assertive tendency and its opposite. And, though, like them, he must be judged to have overdone his part and proved too much, he yet may claim the credit of having given to *fear* a secure place in clinical psychology. But this place has been overwhelmingly established by the observations of a large number of physicians upon the psychoneuroses of war; for they have learnt that many, if not all, of the modes of neurosis may be generated by the terrifying experiences of the battlefield, that is by fear, or, as they commonly prefer to call it, by the *instinct of self-preservation*. Thus fear takes its place alongside sex, self-assertion, and the gregarious impulse, as one of the great impelling forces of thought and conduct, which work independently of the promptings of pleasure and override the principles of mechanical association.

We may, I think, assume that clinical psychology has not yet come to an end of its advance along this line, and may confidently expect that there remain other fundamental impulses of like nature to be discovered by it playing their parts in the genesis of mental and nervous disorders.

Now, it is of the essence of these great fundamental impulses, thus revealed as the underlying motive powers of so much of thought and action, both normal and abnormal, that they are purposive or teleological, and are not to be deterred by pain nor turned aside from their biological ends by pleasure. They override and dominate for their own purposes all the mechanisms of association and the Hedonistic influences. Therefore, their recognition in clinical psychology necessarily leads to a complete break with the mechanistic psychology. Freud's own teachings show clearly the purposive character of much in human conduct that had been regarded as merely the fortuitous outcome of mechanical haphazard association ; that in fact is rightly claimed by his disciples as one of his greatest achievements. Thus he has himself undermined both the mechanistic determinism and the Hedonism which he professes to maintain. And, although clinical psychologists commonly use the phrase "mental mechanisms," this is only for lack of a better mode of expression ; and some of them have grasped the radical transformation of psychology that must result from the recognition of the great rôle of these primary impulses ; a transformation from the deterministic mechanical psychology to a teleological and indeterministic psychology, a radical transformation, because, in spite of the ingenuity of German metaphysicians, mechanical process and purposive action remain utterly and fundamentally different. Most notable among these is Dr. C. J. Jung, who in his "Analytical Psychology" has forcibly shown the practical clinical importance of this revolution, insisting that, so long as we regard the symptoms of our nervous patients as wholly and mechanically determined by the past, we miss their true significance and render our psycho-therapy relatively sterile ; he insists that we have constantly to bear in mind in all our procedures the fact that conduct is determined by ideals of the future that we strive towards, as well as by the events of the past.

Jung also has made a further great step of a more speculative kind. Repudiating the excessive sexualism of Freud and insisting upon the importance of the food-seeking impulse, especially in childhood, he regards all the primary impulses as differentiations of one fundamental energy, the life force which sustains all our strivings, both conscious and unconscious ; thus approaching, but from a very different direction, the conception of the *élan vital* which the greatest of contemporary thinkers, Professor Bergson, has so eloquently expounded.

Turn now for a moment to that other distinctive feature of clinical psychology—the increasing recognition of the part played in conduct and mental life by processes that remain hidden from consciousness. It is difficult to make any general statements about this, because the greatest obscurity and confusion still reign. The facts have not been brought to light by clinical psychologists alone. Others have been impressed by their importance and have prepared the way : Schopenhauer and Hartmann, and F. W. H. Myers notably.

Janet, with his conception of dissociated sensations and ideas, has attempted to give greater precision to the conception of unconscious mental process; and others who, like Janet, have made large use of hypnosis have brought forward, as justifying the conception, all the striking facts of post-hypnotic suggestion. Morton Prince especially, following in the line of Janet, has striven to introduce some clarity into the vagueness which enshrouds this region, by his demonstrations of co-conscious personalities and co-conscious ideas; and to my mind he seems to have made out his case for the truth of these conceptions in certain abnormal cases. But his conception does not cover the whole ground; it does not cover the unconscious or subconscious operations of normal life; and on these Freud has rightly insisted.

The reality, the richness, and the importance of these subconscious operations of the mind have been brought home to many of us with a new force by our experience of the functional disorders of warfare; for no one working among these cases can have failed to come across many instances in which the symptoms, both bodily and mental—amnesias, war-dreams, phobias, anxiety states, paralyses, contractures, epileptiform seizures, headaches, tics, have been undeniably traceable to emotional conflicts and repressed tendencies and ideas, which have operated wholly or partly beneath or without the clear consciousness of the patient.

But Freud and most of his disciples have followed in the line of the "Unconscious" of Hartmann, of Myers' "Subliminal Self," and the "Unconscious Mind" of other authors—that is to say, they have tended to confuse together in one unanalysed mass whatever contents and operations of the mind are not clearly conscious at each moment, and to make of this an anthropomorphic entity, a demon, a god in the machine, whose nature and powers remain entirely unlimited and incomprehensible. And Jung and his followers seem to me to fall in some degree into the same error. I say error, because this way of treating of "The Unconscious" seems to me unscientific; it tends towards a vaguely mystical attitude which, however much in place in religious or metaphysical thinking, does not directly promote, but rather checks, further scientific inquiry into this problem.

I venture to think that this error is again the outcome of the contamination of clinical psychology with the fallacies of the mechanistic psychology, which it professes to repudiate. For that psychology, all mental life was a succession of clearly conscious ideas. It ignored the fact that these ideas are but the eddies and ripples on the surface of a stream, deep within which are the currents and forces of which those eddies and ripples afford only very imperfect indications. This truth is manifested all down the scale of animal life—the instinctive strivings of the animals generally bring them surely to their biological ends, without clear consciousness either of those ends, or of the means by which they are achieved, or of the objects which, by impressing their senses, guide their successive steps. And it is not otherwise with man; he also is borne on to his biological ends, for the most part but dimly conscious of those ends or of the mental forces and processes by which he achieves them.

Just because the mechanistic psychology had ignored these surging hidden streams of the life force, those who, revolting from its inadequacies, have found themselves confronted by evidence of their reality in man, have been startled by the revelation and have seemed to see beneath the only form of mind recognized by the older psychology another system of forces greater and more mysterious, which they have thus been led to regard as a distinct mind or entity—The Unconscious, the Subliminal or Subconscious Self.

A third way in which clinical psychology is diverging widely from the mechanistic psychology is by its discovery of the mind's wealth of innate endowment. The mechanistic psychology inherited Locke's dogma that each mind starts out upon its course of individual experience as a *tabula rasa*, a blank sheet on which experience writes as chance determines.

The recognition of the primary or instinctive impulses, of which we have already spoken, carries clinical psychology a long way beyond this primitive and untenable position, showing the strong native bias of the mind to select and react upon impressions from the outer world, not only according to its individual past experience, but also and chiefly according to its inherited constitution. But among clinical psychologists there is a strong tendency to go further than this, to believe that much of the development of the individual mind is literally a recapitulation of the racial mind, a gradual unfolding at the touch of experience of modes of thinking and feeling and doing gradually acquired by many generations of ancestors. Only by this assumption can they explain the striking uniformity of symptoms which characterize certain mental disorders, and the equally striking uniformity of thinking and feeling revealed by primitive myth and custom among the most diverse races of mankind.

This line of work in clinical psychology promises to contribute very importantly towards two of the greatest problems that confront the human intellect—one strictly biological, the other of more general and philosophical import.

The one is the problem of heredity. If that wealth of inherited forms of thought and feeling, towards which clinical psychology seems strongly to point at present should be further substantiated, this result will decide the issue of the great controversy between those who deny and those who affirm the inheritance of acquired characters. For while it may, perhaps, be plausibly maintained that a few simple instinctive modes of feeling and action may have been impressed upon the race by natural selection alone, every demonstration of a greater richness of this inherited structure of the mind renders this explanation more hopelessly inadequate and drives us back upon the Neo-Lamarckian view, that the experience of each generation impresses itself enduringly upon the race.

The other great problem is that of the constitution of man, the age-long controversy between *materialism* and what in the widest sense may be called *spiritualism.* For so long as it is held, with the mechanistic psychology, that congenitally the mind is a *tabula rasa* and the brain little more than a mass of indifferent nerve-tissue waiting to be moulded by impressions from the outer world, it may seem plausible to hold that all mental potentialities are somehow comprised in the material structure of the germ-plasm. But, with every addition to the demonstrable wealth of innate mental powers and tendencies, this hypothesis becomes more impossible and incredible. And it may safely be affirmed that, if anything like the wealth of innate endowment claimed now by some—e.g., by Jung in his latest work—should become well established, then all the world would see that the materialistic hypothesis is outworn and outrun, and that each man is bound to his race and ancestry by links which, conceive them how we may, are certainly of such a nature that in principle they can never be apprehended by the senses, no matter how refined and indefinitely augmented by the ultramicroscope or by the utmost refinements of physical chemistry. I venture to insist upon this contribution of clinical psychologists towards the solution of these great problems, because few of them seem to have adequately realized the bearing of their work on these issues, which so far transcend in interest even the fascinating and important questions with which they are more directly concerned.

There are many other features of interest in the present position on which I might dwell if time allowed. I have had time to touch only on these few which seem to me the most significant. I have said nothing of the burning questions of method in psycho-therapy, and to do so would perhaps be presumption on my part. But I would like to say one word in the nature of a warning criticism. We are repeatedly asked to accept satisfactory clinical results not only as evidence of the value of the therapeutic methods applied, but also as evidence of the truth of the psychological doctrines on which they claim to be based. The whole history of medicine seems to me to show the danger and the fallacy of this claim. How many accepted therapeutic procedures have been shown to be worthless! How many others, whose value has been proved, have been founded upon, or held to prove the truth of, hypotheses which are for ever dead. And we are relieved from any compulsion to accept such evidence when we notice that the exponents of different methods, based upon different psychological doctrines, claim equally brilliant therapeutic results in the same class of cases; and how even the same clinical worker continues to achieve equally brilliant therapeutic results before and after a radical change of doctrine and procedure. I insist on this as a warning against dogmatism, as an appeal for mutual tolerance and the open mind in this great field where we all wander, groping more or less blindly, among the deepest mysteries of Nature.

I have tried to hint that clinical psychology, now launched upon a great career, is in the position of a brilliant and wayward child, which, throwing aside the traditional wisdom of its parent as of no account, sets forth to acquire a new wisdom *ab initio* and which, though making great strides, is hampered through retaining all unawares some of the prejudices and errors that it believes to have put off. And this brilliant child, as it advances, will inevitably find that there was truth as well as error in that parental wisdom. For the mechanistic psychology was not the whole or even the better part of psychology, it was the work of a sect, a series of persuasive and brilliant writers, who evolved it by deduction from principles set up by physical science, rather than by the patient and detailed study of human and animal life; and it enjoyed a great vogue because it harmonized with the materialistic tendencies of the great age of physical discovery.

But we are now in the age of biological discovery, and, since Darwin initiated this new age, there has been growing up a biological and inductive psychology, a science not springing full blown, like the psychology of James Mill, or of Herbert Spencer, from the reasonings of one powerful mind, but a science, based like other sciences on a vast mass of minute and careful observation, a slowly growing product of the co-operation of a multitude of workers.

This science is showing the same main tendencies, the same trends, as clinical psychology. And it is a bigger thing than clinical psychology because it is based upon a wider field of observation and induction; it is greater as the whole is greater than the part. Clinical psychology cannot afford to ignore this greater stream and to remain in splendid isolation. It is to be hoped that it will renounce the effort to do so, that the brilliant child will return to the parental fold, bringing rich gifts, but gaining in return a greater breadth of view, a greater sanity and balance, a more precise terminology, a greater clarity of thought, and with these, a greater power of dealing effectively with those most distressing of the disorders that afflict mankind, the nervous and mental diseases.

The Methods of Psychotherapy.[1]

By BERNARD HART, M.D.

THE urgent problems presented to us by the war psychoneuroses have naturally led to a greatly increased interest in psychotherapy, and to the devising of many new psychotherapeutic procedures. So numerous and so apparently diverse have these procedures become that a superficial glance at the rapidly growing literature might lead one to suppose that the methods of psychotherapy are legion, and that any attempt to collate and compare them must necessarily be a task of great complexity and difficulty. A closer inspection shows, however, that all the available methods are ultimately dependent upon the employment of one or other of three basic principles, and that they differ only in the extent to which these principles are combined, and in the particular technique by which they are applied. These three basic principles are suggestion, persuasion, and analysis.

Certain schools of thought profess to rely entirely or almost entirely upon one only of the three, and name the method they practice according to the principle selected. Thus Babinski, and the many followers of Babinski who have arisen in this country since the War, employ suggestion, Dubois and Déjerine advocate persuasion, while Freud, and the schools which have developed directly or indirectly from Freud, employ some form or other of analysis. In actual practice, however, these various schools do not confine themselves to a single principle, but in each case there is an admixture of other principles. Thus Déjerine, although a persuasionist, unquestionably uses suggestion to a very considerable extent, and the same criticism applies, though to a less degree, to Dubois, and to the practitioners of analysis. In spite of this fact each school tends to regard itself as the sole possessor of the promised land, and to treat its rivals as foolish mortals floundering uselessly in outer darkness. Now it is clear that, if we are to find our way through all these acrimonious discussions and disputes, it is necessary to determine precisely the nature and relationship of the three basic principles, suggestion, persuasion and analysis, and the extent to which each of these principles is employed by the contending schools. The present paper is an attempt to progress some little way in the direction of this goal.

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[1] At a meeting of the Section, held December 10, 1918.

SUGGESTION.

Suggestion is a widely used term, and is employed in medical literature as a convenient and satisfying explanation for all sorts and kinds of phenomena. Often, indeed, it is put forward as an ultimate and completely sufficient cause, much as if it were comparable in majesty and power to the law of gravity. Now this can only be justifiable if suggestion is a very exact conception, clearly defined and limited, and capable of precise formulation, and our first problem must be to determine how far the concept of suggestion fulfills these conditions. If we turn to the literature of psychotherapy we find that Dubois and Déjerine sharply differentiate suggestion from persuasion. Many of the followers of Freud, on the other hand, hold that persuasion is essentially identical with suggestion, and that the method of psycho-analysis is absolutely distinct from either of them. A third school, again, maintains that psycho-analysis is merely an insidious and prolonged form of suggestion. Turning next to psychopathology, we find that Babinski regards suggestion as a sufficient explanation of hysteria, while other authorities ascribe the phenomena of neurasthenia to autosuggestion. Finally, psychologists tells us that suggestion is a normal process in the human mind, and that it is responsible for our religious and political views, our patriotism, caprices and prejudices.

Now it is clear that something which explains hysteria and neurasthenia, and is a characteristic of normal health, which is responsible for our religion, politics, caprices, prejudices, and therapeutics, must either be a very inexact conception, or denote a factor so widespread and universal that it is useless to invoke it as a weapon of explanation. It explains everything and therefore it explains nothing.

It will be well, therefore, to investigate more closely the sense in which the word suggestion is used by these various authorities, to determine whether this sense is always the same, and whether the word is not sometimes used to denote processes which we already know under other names, and finally to inquire whether it is possible to formulate an exact conception to which the term suggestion may usefully be limited. A convenient starting point for this investigation may be found in McDougall's definition of suggestion as "a process of communication resulting in the acceptance with conviction of the communicated proposition in the absence of logically adequate grounds for its acceptance" [4].

Now the opening words of McDougall's definition "a process of communication" immediately exclude a certain number of the phenomena which some authors bring under suggestion, but even with this limitation it is questionable whether the definition does not cover a field so wide that the conception is of little use as a practical weapon of explanation. Most of our beliefs are held without any logical basis, though by the manufacture of rationalizations we endeavour to find such a basis when our beliefs are attacked, and we are constantly accepting propositions in the absence of logical grounds for their acceptance. The mind of man moves so frequently and universally along this road that to cite the process as an explanation of some particular phenomenon is hardly more satisfying than to explain the peculiar features of some animal or plant by the existence of an atmosphere. To begin with, if we adopt as a reasonable measure of "acceptance with conviction" our preparedness to act upon an idea, it may be said that every communicated idea tends to be accepted with conviction provided that it does not conflict with other ideas. If it is announced to me that dinner is ready, I accept the proposition, and proceed to move into the dining room without instituting an inquiry into the logical basis of the assertion, unless the announcement is made at a time when I am normally expecting to go to bed. This is the process termed "simple communication," and there is no need to invoke any special function of suggestibility to explain its action. Such a process would appear to be all that is necessary to account for certain of McDougall's conditions favouring suggestibility, "lack of organized knowledge" for example. The acceptance by an uneducated man of a proposition patently impossible to anyone with special knowledge of the subject is psychologically identical with my acceptance of the proposition that dinner is ready. When, however, a communicated idea is accepted when there are or should be conflicting ideas present, an obviously different process has come into action. If I am informed that one of my friends is playing golf, and I believe this assertion in spite of the fact that this same friend is sitting by my side, then clearly we are confronted with a phenomenon into which some other factor than simple communication must enter. This other factor is evidently a neglect or inhibition of ideas which are incompatible with the communicated idea. The first amendment to McDougall's definition which we shall therefore venture to propose is that the term suggestion should only be applied where such a neglect or inhibition of conflicting ideas is present. When, indeed, the phenomenon is due merely to neglect, the psychological process is so essentially different from that which underlies inhibition, that it would probably be advantageous to exclude it from the conception of suggestion. If, for example, we accept a proposition when we are fatigued which we should not so accept in our normally vigorous state, this occurs because fatigue has lessened the integrative capacities of our mind, and conflicting ideas are not brought into contact with the proposition which they would otherwise destroy. The process here is psychologically almost identical with the simple communication already described, and essentially similar to the acceptance by an uneducated man of a proposition which is in fact impossible. It would seem advisable, therefore, to reduce the limits of suggestion still further, and to confine it to those cases where there is an actual inhibition of conflicting ideas. This reduction brings suggestion into an interesting relation to attention, for in the latter there is an inhibition of irrelevant ideas, whereas in the former there is an inhibition of relevant ideas. The comparison opens up a promising avenue for speculation, but it would lead to fields outside the scope of this paper, and cannot be pursued further here.

If it is agreed that the essential process in suggestion consists in an inhibition of conflicting ideas and the resultant acceptance with conviction of a proposition based on illogical or non-logical grounds, we may next inquire whether this is a process with which we are already familiar under other names. A little consideration will show that we are very familiar with this process, and that it has received many other names. It is the process which I have called elsewhere "thinking due to the action of a complex" as opposed to "rational thinking"; it occurs whenever our stream of consciousness is directed by emotional or instinctive forces, and it is responsible unquestionably for most of the movements of our mental machinery. The lover does not fervently believe in the perfections of his lady because he has logically deduced those perfections from the facts at his disposal, but because all his thoughts and perceptions are twisted in a definite direction by the emotional systems which constitute his love, and against that directive force all the logic in the world is impotent. Many of the beliefs and opinions of the normal man are due to mechanisms similar in kind, though less grossly obvious. It may be said, indeed, that the greater part of our thoughts and activities are due to forces of which we may or may not be conscious, but which are assuredly not logical in character. Logic plays a part in directing the minor currents in the stream, but the power which drives the stream and determines its main course originates in emotional systems analogous to that which we see in action in the lover. The effect of such an emotional system is to throw into the stream of consciousness ideas belonging to the system, to reinforce currents in harmony with it, and to inhibit currents which are incompatible or in conflict with the goal which it is trying to achieve. These emotional systems are known by many names, bias, prejudice, intuition and so forth, but their action is the same in each and every case, the forcing of the stream of consciousness into a direction which will subserve the goal of the system, and the inhibition of all ideas and tendencies which would conflict with that goal. Now this action is precisely that which we have seen to be characteristic of suggestion, and it will immediately be clear that suggestion is merely a particular example of the activity of an emotional system of the kind described. To use the terminology which we have employed elsewhere, suggestion is a variety of "complex thinking."[1] How large a variety it constitutes is a matter of definition and arbitrary limitation. But its utility as a weapon of explanation obviously depends on the preciseness of the definition and the narrowness of the limitation, for if we make the conception so wide that it practically includes all types of "complex thinking," it will also include most of the mental activity of man, and its value as an explanation of some particular phenomenon will be almost negligible.

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[1] *Vide* the author's "Psychology of Insanity," Cambridge University Press, Chap. V. "Complex" is used therein in a more extended sense than that generally given to it, and indicates any affective system capable of directing and influencing the stream of consciousness.

These considerations enable us to understand the apparently discrepant views as to the nature and action of suggestion held by the various authorities whom we have quoted. The discrepancies are due to the wider or narrower limits assigned to the concept of suggestion by each authority, and in part also to the absence of any clear cut concept, or of any definite limits. While in some cases suggestion is regarded as including the whole sphere of "complex thinking," in others it is narrowed down to include only hypnosis and closely allied phenomena, and between these two extremes every intermediate grade may be found. Those who explicitly or implicitly embrace the first extreme interpretation, and who bring under the head of suggestion every mental process due to the action of an emotional factor, naturally explain a vast number of phenomena thereby, but factors of this kind are so universal that the explanation is correspondingly unsatisfying and incomplete. The explanation is true enough so far as it goes, but it does not go far enough to be of any practical use. If our knowledge is to be advanced we require to know what is the particular emotional factor involved, and what are the precise circumstances of its operation. A perusal of the literature makes it very clear, indeed, that the indiscriminate use of the word suggestion in these cases is altogether pernicious, because too often it is regarded as a completely satisfying explanation, and the necessity of making further inquiries is entirely neglected.

It is evident, then, that if the conception of suggestion is to be practically useful it must be narrowed down to limits which will mark off a definite variety of "complex thinking," and which will not include any and every variety to which the word has been hitherto loosely applied. These limits will naturally be a matter for arbitrary selection, but it will be agreed that they should be so fashioned as to include within their boundaries those processes to which the word suggestion is universally applied, and only such other processes as can be shown to be closely allied thereto. In this way the common signification of the word will be preserved as nearly as possible. Now the processes which are universally regarded as typical instances of suggestion are the phenomena which occur in hypnosis, and the allied phenomena which are capable of being produced in the waking or normal state, and if we are to find an exact conception of suggestion it must be sought by an investigation of the essential features of these phenomena. In the typical instances in question a proposition is explicitly or implicitly stated by one person, and is accepted with conviction by another person, and it would probably be best to apply the term suggestion only to those cases where this direct relation between persons exists. This limitation is, in fact, partly but not completely implied by the opening words of McDougall's definition "a process of communication." The amended definition of suggestion resulting from these various considerations would therefore read "a process of communication whereby a proposition is communicated by one person to another and is accepted with conviction by the latter in the absence of logically adequate grounds for its acceptance, and owing to the fact that conflicting processes which are or should be present are inhibited."

It is evident that even this amended definition does not give us a conception with sharply cut limits, for it is easy to adduce a whole series of instances linking up the typical examples of suggestion to almost any and every variety of "complex thinking." If we are to establish a sharply cut conception, it must be shown that in each case where a proposition is accepted in this manner the acceptance is due to the action of one particular psychological mechanism, and we may next inquire how far it is possible to accomplish this.

Now in all cases of "complex thinking" the essential feature of the process is that the stream of consciousness is directed by a force which we have loosely described as an "emotional system." Although these "emotional systems" may apparently be of all sorts and kinds it will be found on analysis that they all derive their propulsive and directive power from the incorporation within them of one or more of the great instinctive forces of the mind. The demonstration of this vastly important fact is the noteworthy achievement of McDougall's work on social psychology. If all "complex thinking" is due to the action and interaction of instinctive processes, then suggestion, which is only a variety of "complex thinking," must also be dependent on forces of this character. Now if it could be shown that suggestion, in the limited sense we have proposed, owes its effect to certain particular instincts, or to a definite combination of instincts, we might then be able to formulate the exact conception of which we are in search. Several attempts have, in fact, been made to explain the process of suggestion by the action of such particular instincts or their combination. McDougall [4] ascribes it to the interaction of the instincts of self-assertion and self-abasement. Trotter [5] practically identifies suggestion with herd-instinct, while Freud and his followers [3] maintain that the motive force is provided by the sex instinct. Space will not permit of a detailed examination of these various views, but it may be said that none of them is entirely satisfactory, and none of them provides the clear cut conception we need. The evidence would seem to indicate, indeed, that the phenomena commonly ascribed to suggestion are not due to the action of any one instinct or combination of instincts, but that the motive force may be derived from different sources in different cases.

The conclusion to be drawn from these considerations is that, even within the narrow limits with which we have attempted to circumscribe it, suggestion is not a well defined conception capable of affording a complete explanation of any phenomenon. When a phenomenon is ascribed to suggestion we have learnt little more than that it belongs to the sphere of "complex thinking," and is therefore due to the action of an emotional, or more properly, instinctive factor. Such a classification can obviously form only a first stage of the investigation, and to obtain anything that can be reasonably called a complete explanation we must ascertain the particular emotional factor at work, and the precise circumstances in which it acts. This criticism applies to many of the attempts that have been made to explain the mechanism of the psychoneuroses, such as the theory of Babinski and his followers which postulates suggestion as the essential cause of hysteria. This theory demonstrates an obvious fact of observation, but leaves out everything worth explaining—why the patient is so abnormally suggestible, what is the particular emotional force responsible for the suggestion, and why he has developed these particular symptoms and not others. The answer that is sometimes given to these further inquiries, that the patient has an hysterical constitution, is a refuge strictly comparable to Molière's famous explanation of the hypnotic properties of opium, but hardly worthy of admission within the portals of science.

Another word frequently cited as a convenient explanation for various phenomena is autosuggestion, and here again usage is so loose and ambiguous that the need for definition and limitation is imperative. One sense in which it is used is, for example, to explain the process by which a patient who is convinced that his arm is paralysed actually develops a functional paralysis of the arm. Now the process by which the actual paralysis follows the conviction is probably direct and inevitable, the two stages being little more than different aspects of one and the same fact, but whatever its nature may be it has certainly nothing to do with suggestion. The suggestion lies farther back in the sequence of causes, and is responsible for the acceptance with conviction of the proposition that the arm is paralysed. Once this proposition is so accepted the actual paralysis follows inevitably, but by a mechanism in which suggestion plays no further part. In this sense, therefore, in so far as the word is not definitely misleading it is merely tautological. Another sense in which autosuggestion is employed is to designate those varieties of "complex thinking" in which a direct relation between persons is not involved. That is to say, it designates all "complex thinking" except suggestion in the narrowed meaning we have advocated for that word, and is proferred, for example, as an explanation of our politics, prejudices and so forth. Here again the term would seem to be misleading and redundant. A third sense in which autosuggestion is used is to describe a process whereby one seeks to narrow down one's field of consciousness and to fill it with a single idea as, for instance, when we endeavour to produce a pseudo-hallucinatory sensation by fixing our attention on a small area of our skin. The process here clearly presents some resemblance to the production of similar phenomena by hypnosis, and in this limited sense the use of the word autosuggestion is probably justifiable.

We may sum up the position now reached as follows. All the processes ascribed to suggestion are in reality examples of "complex thinking," and how large a section of "complex thinking" is to be included under suggestion is a matter for purely arbitrary selection and limitation. Probably it would be practically advisable to limit the term to processes of communication involving a direct relation between persons, but even here no specific elements are present. In every case the only essential feature is the action of an emotional or instinctive factor, which is the essential feature of all "complex thinking." Processes of this kind are, however, so common in the human mind that to explain any particular phenomenon by ascribing it to "complex thinking" or to "suggestion" is altogether inadequate. The explanation can only be accepted as satisfying and complete when we have ascertained the particular emotional factors responsible, and the conditions under which they have produced their results.

This preliminary investigation of the nature of suggestion has necessarily been somewhat lengthy, but it has enabled us to achieve a standpoint from which our main problem, the use of suggestion as a therapeutic agent, may be easily attacked. The therapeutic aim of suggestion is to implant in the mind of the patient a certain conviction, and this conviction generally consists in the firm belief that a symptom has disappeared, or is about to disappear. Its utility in the psychoneuroses is dependent on the fact that many of the symptoms of these disorders are the result of beliefs held with conviction by the patient. However intricate and lengthy the chain of causation which has produced them may be, the penultimate link in the chain is the conviction that certain symptoms are present. A functional paralysis of the arm, for example, may be the final result of a long chain of psychical causes, but the penultimate link is the conviction that the arm is paralysed. Now the object of suggestion is to destroy that conviction by implanting in the mind the opposite conviction, namely that the arm is not paralysed, and if this process is successful the chain of causation is broken at its penultimate link, and the symptom disappears. Suggestion is able to accomplish this by virtue of its capacity for inhibiting conflicting ideas and tendencies, whereby the action of the ideas and tendencies responsible for the symptom is blocked, and the conviction communicated by the suggestion is permitted to flourish unchecked. This capacity is dependent upon the employment of an emotional or instinctive factor, and, in the narrower conception of suggestion we have proposed, this emotional or instinctive factor is one involving a direct relation between two persons, the doctor and the patient. The consideration of the wider question, how far and in what way emotional or instinctive factors which do not involve this direct relation between persons may be employed as therapeutic agents, will be postponed until we have considered the nature of the second basic principle, persuasion.

PERSUASION.

Persuasion, like suggestion, is a term of regrettably vague and ambiguous character. It is used in the literature in two quite distinct senses which may be fathered upon Dubois [2] and Déjerine [1] respectively. For Dubois it is a purely logical process, for Déjerine it is a logical process, but one in which affective factors play a necessary and important part. These two conceptions must naturally be dealt with separately. Dubois conceives persuasion as a process in which certain effects are produced by chains of logical reasoning, and distinguishes it sharply from suggestion. The latter is dependent upon blind faith, while the former appeals to clear logical reason. Now, if we bear in mind the analysis of the nature of suggestion which has already been made, the relationship to it of Dubois's conception of persuasion is immediately apparent. This relationship is identical with that which exists between "rational thinking" and "complex thinking." In the former the stream of consciousness proceeds in a direction determined entirely by the intrinsic values of its elements, each step being the logical consequence of the preceding steps. Emotional factors play no part, and the conclusion follows inevitably from the premises just as a proposition of Euclid inevitably leads us along a road fixed by the logical relationship of its terms. The conclusion can be predicted with certainty by an observer who knows only the proposition and nothing at all of the man who is thinking it. In "complex thinking," on the other hand, the direction of the stream of consciousness is conditioned by emotional factors which force it into a path which will subserve the aim of the emotional system in question, and which distort the logical relationship of its elements so that this aim may be achieved. Here the conclusion cannot be predicted unless the observer knows not only the proposition, but also the man who thinks it and the emotional systems which dominate his mental activity.

If persuasion is identical with rational thinking then it is clear that the superiority to suggestion which Dubois claims for it is based on very solid grounds, for rational thinking leads to knowledge, whereas suggestion leads only to beliefs erected upon an insecure foundation. The sole question which arises is how far rational thinking can be used for therapeutic ends and how far it is capable of destroying the convictions responsible for psychoneurotic symptoms, for the impotence of logic against the creations of an emotional system is a phenomenon which is only too frequent and obvious. In practice, indeed, it will be found that the utility of Dubois's persuasion is severely limited on account of this difficulty, but it is nevertheless indubitable that it has utility.

The therapeutic employment of persuasion is dependent upon a process which in its final stages is identical with that which occurs in suggestion. We have seen that many of the symptoms of the psychoneuroses are the result of beliefs held with conviction by the patient, and that, however intricate the chain of causation may be, the penultimate link is the conviction that certain symptoms are present. Now the aim of persuasion, just as the aim of suggestion, is to implant in the mind of the patient the opposite conviction, namely that the symptoms have disappeared, or are about to disappear. This is explicitly stated by Dubois in the following words: "The nervous patient is on the path to recovery as soon as he has the conviction that he is going to be cured; he is cured on the day when he believes himself to be cured" [2]. To take again the example formerly selected to illustrate the action of suggestion, that of functional paralysis of the arm. If this condition is treated by persuasion the aim, just as before, is to destroy the conviction that the arm is paralysed, upon which the actual paralysis is dependent, and to implant in its stead the conviction that the arm is capable of normal movement. But in this case the conviction is achieved, not as the effect of an emotional process, but as the logical result of a chain of reasoning. It is demonstrated to the patient, for example, that all the tissues of his arm are healthy, that none of the signs which inevitably belong to an organic lesion are present, that the muscles of the arm are actually capable of work, and so forth. From all these premises the conclusion that the arm is not paralysed follows as an inevitable logical deduction.

Déjerine's conception of persuasion cannot be so easily described and placed in its relation to other methods. This difficulty arises, I believe, because his conception does not correspond to any simple process, but is made up of a variety of processes essentially different one from another. In various passages in which he defines persuasion as he understands it, he states, for example, that persuasion consists in explaining to the patient the true reasons for his condition, in establishing the patient's confidence in himself, and in awakening the different elements of his personality capable of becoming the starting point of the effort which will enable him to regain his self-control; he says, further, that in order for this to happen an element of feeling must intervene between the doctor's reasoning and the acceptance of this reasoning by the patient, and that psychotherapy depends wholly and exclusively upon the beneficial influence of one person on another [1]. Now at least three distinct processes are involved here. First, the explanation to the patient of the nature of his condition is a reasoning process identical with the method of Dubois. Secondly, in so far as the effect is dependent upon the beneficial influence of one person on another, it is dependent upon an emotional relation existing between the two persons, and is therefore clearly due to suggestion in the narrower sense. Thirdly, the employment of the various elements of the patient's personality as weapons for achieving the therapeutic end consists essentially in making use of those emotional forces in the patient which do not necessarily involve a direct emotional relation to the doctor, and is therefore identical with "complex thinking" in general. This third process is the only one which we have not already investigated. It will be remembered that at the end of the section on suggestion we postponed for later consideration the question how far and in what way emotional or instinctive factors which do not involve a direct relation between persons may be employed as therapeutic agents. This question must now be examined, for it is evident that the third process contained in Déjerine's method is an attempt to provide a practical answer to it.

We have seen that most of the movements of our mental machinery are due to the driving power exerted by emotional systems, that these systems direct the stream of consciousness into channels which will subserve their goal, and that a great part of our beliefs and opinions are due to agencies of this character. Now it is clear that by suitable stimulation and combination of the emotional systems existing in our patients, effects can be obtained which will have a therapeutic value. Thus, by making use of the religion, ambitions, affections and other weapons which are available in the patient's mind we may be able to destroy or mould into other forms the mental processes responsible for his symptoms. The effect here is due to the employment of emotional factors, but it is not mainly due to the employment of an emotional relation existing between the doctor and the patient. It is in other words the result of "complex thinking," but not the result of suggestion in the narrow sense. The part played by the doctor here is comparable to the action of an engine driver who merely directs the forces produced in the engine.

This process constitutes one of the most powerful and efficient weapons in our therapeutic armoury, and we shall subsequently see that it is employed, to some extent at least, by all psychotherapists, to whatever school they may profess to belong. Sometimes it is used merely as a method of removing symptoms, the object being, just as in the case of suggestion, to produce in the patient a conviction that the symptoms have disappeared or are about to disappear. In other cases, however, it is used as a means of readjusting the causes which are ultimately responsible for the symptoms. Here the previous elucidation of the causes by some analytical method is necessarily presupposed, and we may now pass on to investigate the nature of these analytical methods.

ANALYTICAL METHODS.

The term "analysis" is used in this paper to indicate any method whereby the nature and relationship of the causes responsible for the patient's condition are determined, and the condition removed by the rearrangement and readjustment of these causes. It is not meant to be synonymous with psycho-analysis, a word which should only be applied to the method devised by Freud and generally associated with his name. Psycho-analysis is clearly analysis, but the latter is a wider term and one applicable to all therapeutic procedures which satisfy the definition given above. It is unquestionable, of course, that all modern analytical methods owe a great debt to the work of Freud, and that in each and every one of them many of his essential principles are incorporated. Psycho-analysis, however, involves the acceptance of a particular theory of causation, and should not be used to designate methods which are not governed by this theory.

The employment of analysis as a therapeutic measure is based on the assumption that certain disorders are of psychogenic origin. If this assumption is admitted, if it is agreed that some disorders are the result of a chain of mental causes, then it is immediately obvious that treatment should aim at elucidating those causes, and then so altering or rearranging them that their original effect is no longer produced. This procedure is so evidently demanded by all the canons of scientific medicine that the point is hardly worth labouring.

How many and what disorders are to be included in the psychogenic group is a question which cannot be fully answered in the present state of our knowledge. We are yet uncertain, for example, how far the various types of insanity can be brought under this head. So far as the psychoneuroses are concerned, however, the view that they are essentially of psychogenic origin has steadily gained ground during the past fifty years, and has been so confirmed and extended by the experiences of the War, that it would be fair to say that it is now accepted by almost every authority in every country. If this is so, then clearly the analytical method of treatment is eminently applicable to these disorders. Dispute can only arise as to the nature and action of the causes responsible, and the relative merits of different methods of ascertaining and removing them. It is upon differences of opinion with regard to these matters that the therapeutic procedures adopted by various authorities are based, but the examination and criticism of these differences would take us far beyond the limits of this paper, which aims only at the consideration of broad general principles.

RELATION OF SUGGESTION, PERSUASION AND ANALYSIS AS THERAPEUTIC METHODS.

We are now in a position to consider the relation between suggestion, persuasion and analysis as therapeutic methods. Analysis is distinguished from the other two in that it is aimed at the causes responsible for the condition, and seeks to remove the condition by removing or rearranging those causes, whereas suggestion and persuasion, in so far as they are not combined with analysis, are aimed solely at the symptom, and seek to remove the symptoms without reference to the causes which have produced them. This distinction may be made clear with the aid of the following diagrams.

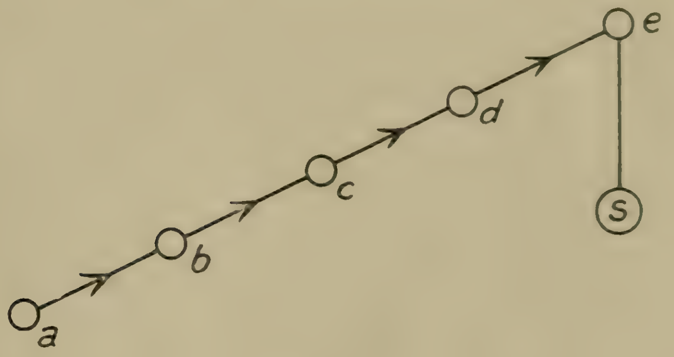

FIG. 1.

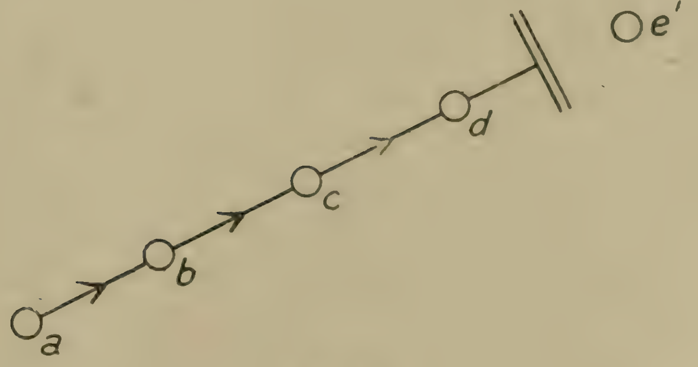

FIG. 2.

Fig. 1 represents the chain of causation responsible for the appearance of certain symptoms, *a*, *b*, *c*, *d*, *e* indicating causal factors, and *s* indicating the symptoms produced by their interaction.[1] In a large number of the symptoms of the psychoneuroses the penultimate link (*e*) will consist in the conviction that a certain symptom is present, and from this penultimate link the symptom itself follows directly in the manner already described. Now if this condition is treated by suggestion, attention is directed solely to the penultimate link, and an endeavour is made to destroy this, and to substitute for it the conviction that the symptom is not present (e^1). If the procedure is successful the symptom promptly disappears, because the chain of causation responsible for it is broken. The break is effected, however, only at the penultimate link, the causes, *a*, *b*, *c*, *d*, are left *in situ*, and the situation achieved is as represented in fig. 2. It will be clear that, as the primary causes have not been attacked, there is an obvious possibility either of relapse or of the development of another similar symptom, a possibility notoriously borne out by clinical experience.

If, next, the symptom is treated by pure persuasion a very similar state of affairs is produced. The aim as before is to destroy the penultimate link (*e*), and to substitute for it the conviction that the symptom is not present. This is accomplished here, however, not by implanting the conviction with the aid of an emotional factor, but by collecting together trains of thought which will lead to the conviction by their intrinsic logical force. The situation now is represented by fig. 3, where *f*, *g* and *h* indicate the trains of thought in question which have produced the conviction (e^1) that the symptom is not present. The symptom disappears just as in the case of treatment by suggestion and for the same reason; it will be observed, however, that the primary causes are again left untouched. This similarity between the two methods of treatment is evidently not always appreciated by the exponents of pure persuasion, and suggests that the vaunted superiority of persuasion is of doubtful validity. It may be said, however, that it is unquestionably superior to suggestion in that the removal of the symptom is achieved by an integrating process presumably more stable than the mere implantation of a belief without support or foundation.

If, lastly, the symptom is treated by analysis, attention is directed, not merely to the penultimate link, but to all the links in the chain of causation. When these have been ascertained an endeavour is made to destroy or to rearrange them in such a manner that they are no longer capable of producing their original effect, namely the symptom. If this is successful the symptom again disappears, but it disappears now because the whole chain of causation has been fundamentally altered. The situation thus attained is represented by fig. 4, where *a*, *b*, *c* and *d* have been rearranged in a new pattern which no longer leads to *e* or *s*.

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[1] The diagram is, of course, purely schematic and unduly simplistic. The causes would be represented more properly by a network of circles than a line of circles, but this has been omitted in order to avoid complicating the figure.

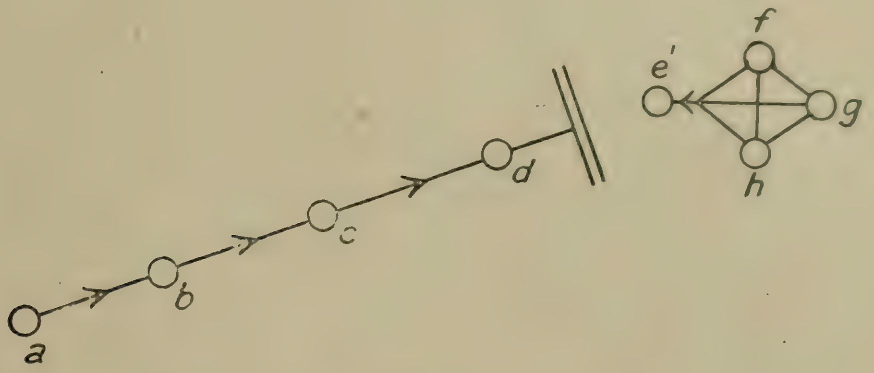

Fig. 3.

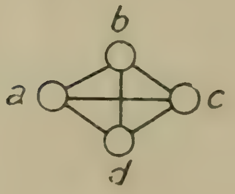

Fig. 4.

The processes crudely illustrated by these diagrams will be rendered more comprehensible by the consideration of an hypothetical case. We will suppose that we are required to treat an hysterical monoplegia of the right arm occurring in a soldier who has been buried by a shell explosion. This symptom is not the result of a single cause, but of a concatenation of causes, amongst which the following may all have played a part. The patient sustained a trifling injury to his arm in childhood, which did not produce any noteworthy physical effect, but made a lasting impression on his mind. Secondly, he had been assured by his relatives, and possibly by his doctor, that as a result of the injury the right arm would always be weaker than the left. Thirdly, when the shell burst a sandbag fell on the right arm. Fourthly, the soldier had been suffering for some time previous to the final shell explosion from a gradually increasing "nervousness" and anxiety, due to the conflict between the opposing forces of self-preservation and discipline, the conflict which is the characteristic feature of the war neuroses. This conflict had latterly become acute, and it was a biological necessity that some solution of the situation should occur. Hence had arisen the unconscious motive which is an integral factor in the causation of all psychoneuroses, the motive which desires a disability as the only solution whereby the conflict can be satisfactorily relieved. As a result of the interaction of all these, and perhaps of other causes, the penultimate link (*e*), the conviction that the arm was paralysed, was produced, and the actual paralysis followed inevitably.

Now, if this condition is treated by suggestion, our object is to produce the conviction that the arm is not paralysed. This is achieved by hypnosis or other method of suggestion, and the paralysis promptly disappears. No attention whatever is paid to the causes which produced the symptom. Their original outlet is blocked, but they are left as a pathogenic focus whence may develop similar or other symptoms. If on the other hand, the condition is treated by persuasion, we seek to prove to the patient by a logical demonstration that his arm is not paralysed. We show him that all the tissues are healthy, that the signs which should accompany a real paralysis are absent, that if we lift his arm and then remove the support while his attention is diverted the arm does not drop immediately, and that therefore his muscles must actually be functioning. By collecting together these and similar arguments we shake and finally destroy the conviction on which the paralysis is dependent, and when this aim has been attained the paralysis inevitably disappears. But it will be observed that here again the causes primarily responsible for the paralysis have not been investigated or attacked, and the pathogenic focus is left untouched just as in the case of suggestion. If, finally, the condition is treated by analysis, all the causes mentioned above are first unearthed, and then an attempt is made to destroy or rearrange them. This latter process may consist, for example, in bringing the various factors into the full light of consciousness, making their relationship and significance apparent to the patient, and subjecting them to the solvent action of the forces available in the patient's mind, his ambitions, self-respect, religion, traditions, or whatever other weapon can be pressed into service. It will be clear that we are employing here the process which was found to form a part of Déjerine's conception of persuasion, the utilizing of the emotional factors existing in the patient's mind as weapons capable of readjusting and integrating the mental elements responsible for the symptoms. Only in this case the method is applied to the causes ultimately responsible, which have been elucidated by analysis, and not merely to the symptoms themselves.

These considerations lead to the conclusion that analysis is obviously superior to the other methods we have considered, and it might be supposed that it ought always to be used to the exclusion of the others. This would be an erroneous deduction, however, because it is found in practice that a considerable number of conditions can be dealt with more rapidly and conveniently by the employment of suggestion or persuasion. Certain hysterical symptoms, such, for example, as paralysis, functional gaits, mutism and so forth can be removed with ease and speed by suggestion or persuasion, which would involve a lengthy and complicated procedure were they treated solely by analysis. It may be said, nevertheless, that even in these cases treatment is far from being adequate and complete unless the removal of the prominent symptoms is followed by an analysis aimed at the elucidation and rearrangement of the ultimate causes. Only in this way can a reasonable stability and freedom from relapse be secured. Cases where the mere employment of suggestion or persuasion has produced apparently solid cures are frequent enough, but this is probably due to the fact that an alteration of the primary causes has been effected by some means independent of the actual treatment. A war hysteric, for example, may have his symptoms removed by suggestion, and may then be discharged from the Army, so that the most important of the ultimate causes, the conflict between self-preservation and duty, is rendered inert. Reasons of this kind no doubt help to explain the fact that treatment by suggestion or persuasion is often far more efficient and satisfactory in war psychoneuroses than in the psychoneuroses of the civilian. In any case the sphere of these methods is certainly limited, and they are only capable of application to a comparatively small section of the great group of the psychoneuroses. It would seem, indeed, that they are applicable only to those cases in which the penultimate link in the chain of causation consists in the conviction that a certain symptom is present. Where this link is absent, and where psychical causes have produced symptoms without its intervention, suggestion and persuasion by themselves seem to be impotent. This holds for example in the anxiety neuroses, which bulk largely amongst the war cases, and in which analytical methods of one kind or another are a necessity.

Throughout this paper suggestion, persuasion, and analysis have been sharply distinguished from one another, and regarded as independent methods of treatment. This has been necessary for the purpose of investigating and correlating the basic principles involved. It has already been indicated, however, that in actual practice no school of thought relies exclusively on any one of the three, and that every psychotherapist employs at least two and often all three principles. The practitioner who confines himself to suggestion is impotent when faced with many types of psychoneuroses, and crude and inadequate in his treatment of all types. Dubois employs a certain amount of analysis and a considerable dose of suggestion. A perusal of Déjerine's work provides instance after instance of the use of analysis, and the employment of affective factors is an integral part of his method. Some of these affective factors clearly belong to suggestion, however narrowly we may define that term, and all of them come under that general conception of "complex thinking," which is identified with suggestion by many authorities, and is most certainly closely allied thereto. A similar criticism applies to all the analytical schools. If it be agreed, indeed, that the driving forces of the mind are all ultimately dependent upon the interplay of instincts, then it is clear that without these emotional factors the mind cannot do anything, and nothing can be done to the mind.

CONCLUSION.

We may now attempt to sum up the conclusions reached in the foregoing pages. It was originally stated that all methods of psychotherapy are dependent upon the employment of one or more of three basic principles, suggestion, persuasion, and analysis. Our investigation has shown, however, that suggestion is a term of vague and indefinite connotation, ranging in meaning from a conception identical with "complex thinking" to a conception covering only the phenomena observed in hypnosis, and closely allied phenomena. Under these circumstances it would seem advisable to employ some other term to indicate that wider conception of suggestion which includes within its boundaries any employment of affective factors as curative agents, and to limit suggestion to those instances where the affective factors are those involving a direct affective relation between the doctor and the patient. The wider term which would seem the most appropriate for this purpose is "affective therapeutics." Our original statement would then be modified so as to read that all methods of psychotherapy are dependent upon the employment of one or more of three basic principles, affective therapeutics, persuasion, and analysis. The characters of these three principles may be described as follows.

Affective therapeutics consists in the employment of the various emotional, or more properly instinctive, factors existing in the patient's mind as weapons whereby pathogenic mental processes may be destroyed or altered. The method is dependent upon the property possessed by these emotional factors of furthering tendencies in harmony with them and inhibiting opposing tendencies. When the emotional factor employed consists in an affective relationship between doctor and patient the process becomes suggestion in the narrow sense. When the factors employed do not involve this direct relationship, then we have the process which is an integral part of Déjerine's persuasion, as it is indeed of all psychotherapeutic methods, but which is clearly distinct from the persuasion of Dubois.

Persuasion, in the sense of Dubois, consists in an endeavour to destroy a pathogenic mental process by reasoning, the effect being produced not by any emotional factor but by the logical force of the arguments presented to the patient. In itself this method is probably almost impotent, but combined with affective therapeutics it becomes a powerful and efficient weapon.

Analysis consists in an investigation of the causes responsible for the patient's condition, and the removal of the condition by the removal or alteration of the causes.

These three principles can be clearly distinguished theoretically, but in actual practice more than one principle is almost inevitably employed. Every psychotherapist, although he may style himself suggestionist, persuasionist, or analyst, makes use of at least two and often of all three principles. Suggestion and persuasion by themselves have but a limited field of application; they are only capable of dealing with symptoms, and probably only with symptoms which are directly dependent upon the existence in the patient's mind of a certain conviction. Affective therapeutics, other than suggestion in the narrow sense, has a wider application, but its use as an accurate weapon presupposes a preliminary analysis. Analysis is clearly the ideal method, but it is more properly a stage in treatment rather than a method complete in itself. By its employment the various causal factors responsible for the disordered condition are elucidated, but when this has been achieved there remains the further task of rearranging or eliminating these causal factors, and in this latter process persuasion and affective therapeutics are probably invariably called into play.

Practical psychotherapy, therefore, necessarily involves an admixture of principles, and this admixture will be there however the physician may endeavour to exclude it. Suggestion, for example, is omnipresent, and will obviously come into action wherever there is a doctor and a patient. It is surely better then, that this action should be correctly estimated and deliberately utilized rather than left to the vagaries of chance. The task of the physician is to cure the patient, and in order to achieve this end he should be prepared to make use of any and every weapon which lies to his hand. Affective therapeutics, persuasion and analysis all have their place, but treatment can only be efficient if their nature and limitations are clearly understood, so that the physician may choose and combine his weapons according to the condition which has to be attacked.

REFERENCES.

[1] DÉJERINE, J., and GAUCKLER, E. "The Psychoneuroses and their Treatment by Psychotherapy," Philad. and Lond., 1913.

[2] DUBOIS, P. "The Psychic Treatment of Nervous Disorders," New York and Lond., 1909.

[3] JONES, ERNEST. "The Action of Suggestion in Psychotherapy" ("Papers on Psychoanalysis"), 2nd ed., Lond., 1918.

[4] MCDOUGALL, W. "Social Psychology," 12th ed., Lond., 1917.

[5] TROTTER, W. "Instincts of the Herd in Peace and War," Lond., 1915.

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War Psychiatry.[1]

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In dealing with psychiatry in relation to the Army, one must bear in mind that we have to some extent different human material to consider than in civil life. There is somewhat of an age limit, mainly from 18 to 40 years, and we have in the Service men who have been through some sort of recruiting examination and so presumably a good many mentally unfit have been thus eliminated. We have then, a large body of the male sex only, who all have to adapt themselves more or less to the same environment and experiences. In civilian life there is a greater variety of age, individual, and environment. From this we may surmise that some types of psychoses will not commonly be met with in the Army, and that the special circumstances involved in war will tend to bring about types of mental reactions not so frequently seen in ordinary life. One must also bear in mind that the mere fact of removing an individual from his civilian occupation, taking him out of an existence, where within wide limits he had such great liberty of thought and action, and placing him in such a different environment in which he finds an unaccustomed iron discipline whereby he has this freedom at once almost entirely curtailed, tends to engender mental reactions which may be abnormal, and especially so in those who have a psychopathic constitution. Before the Commission which sat to inquire into recruiting problems, in the evidence given by the military authorities, the opinion was freely expressed that if a man was fit enough to do any form of work in civil life, he was fit to do that work in the Army. This is a great fallacy. Large numbers of cases which have been returned from overseas with psychopathic symptoms freely illustrate the falsity of this statement. The mental factor has not had anything like the consideration it should have had. One can formulate few rules on such a point, and every case should be treated on its individual merits. If there be any evidence of mental maladaptation in civil life, how much greater will be the probability of such under the complex conditions of military life, and still more so in actual warfare?

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[1] At a meeting of the Section, held March 11, 1919.

One can readily understand that in discussing the ætiology of war psychoses one has to take a very broad outlook, for the various factors which may predispose and be directly and indirectly causative, are manifold and complex. War psychiatry is almost a new study. During the years of modern medicine the soldiers taking part in active warfare have been trained and picked men, and for the first time the civilian population have been more or less suddenly called upon to fill the ranks of large armies. The conditions of warfare have also changed so much. Enormously high explosives, poisonous gases and flame fire have been added to the Army's armamentarium, while bombing from the air and the peculiar methods of trench strategy have added so greatly to the mental and physical strain of the combatants.

Previous to the present war the only literature of any kind that existed on war psychiatry emanated from the Russians, for during the Russo-Japanese campaign for the first time mental diseases were separately cared for by specialists from the firing line back to the home country. The total number sent back is believed to have been very nearly 2,000. Some detailed statistics thus came to hand which I do not propose to discuss now, but only draw attention to the surprising statement that psychoses showing the largest percentages were epileptic psychoses, 22·5 per cent., and alcoholic psychoses, 19·5 per cent.

In considering the factors tending to bring about a mental breakdown, one should first bear in mind the point I have already alluded to—viz., that the necessary abnegation of free thought and conduct, combined with the fact of becoming subject to an unaccustomed iron discipline, is sufficient, especially in the psychopathically disposed, to produce unhealthy mental reactions. Such reactions must, too, be helped on to a great extent by associative factors, the leaving of home and those near and dear and in many cases dependent on them, the blighting of ambitious hopes in civil life, the fear of financial loss and business ruin, and maybe the dread of future incapacity and loss of life. Doubtless the herd instinct with the average man tends to overwhelm these incapacitating thoughts and feelings, and the "crowd emotion" gradually but surely begins to fill him with martial and patriotic sentiments, so that before long he is striving hard to be an efficient soldier, and even longing to come to grips with the foe. Nevertheless many experiences may render him individualistic again, and it is then that mental conflicts are set up which in the predisposed may result in psychopathic reactions. Should he have had previous mental breakdowns, his outlook in any circumstances is worse, but he is usually ashamed to mention the fact at the time of medical examination, though even when known to the authorities the fact is often ignored. I had a man under my care upon whose history sheet was marked under the heading of "slight defect, but not sufficient to cause rejection"—"two previous attacks of insanity."

Generally one hears of war psychoses as tending to be brought about by the "*stress and strain*" of warfare. Such a vague term would supposedly comprise mainly the factors of mental and physical exhaustion and climatic conditions, and these alone would not produce a mental disturbance probably without other issues being involved. In my opinion, the so-called "exhaustion psychosis" requires much investigation. *Intense physical exhaustion alone can produce no psychosis.*

The war correspondent of the *Daily Chronicle* on April 3, 1918, wrote concerning the men who had fought for six days and nights as follows:—

> "They were tired almost to death, and when called on to make one last effort after six days and nights of fighting and marching, many of them staggered up like men who had been chloroformed, with dazed eyes and grey and drawn faces, speechless, deaf to words spoken to them, blind to the menace about them, seemingly at the last gasp of strength. Towards the end of this fighting they had a drunken craving for sleep, and slept standing with their heads falling against the parapet. In body and brain these men of ours were tired to the point of death. They felt like old, old men. Yet after a few days' rest they were young and fresh. It was almost impossible to believe

they were the same men. They had washed off the dirt of battle and shaved, and the tiredness had gone out of their eyes and their youth had come back to them."

This graphic description pictures very vividly how, although the extreme limit of exhaustion had been reached, with a few days' rest the normal state was regained without any ill-effect to body or mind. If intense exhaustion produces chemical toxins, which, acting upon the nervous system, are said to bring about a confusional psychotic state, how can we explain the fact that the experience just spoken of is quite frequent, and yet these men retain their normal mental health? It is very possible that some lowering of resistance may be left which may predispose the men to a remote breakdown, but it is very doubtful if even that would occur without some definite psychogenetic factor.

Birnbaum has pointed out that pictures similar to the so-called exhaustion states often occur "solely in consequence of psychic shock, as symptoms of frank psychogenetic disorders, and that there is much to suggest the purely psychic origin of these disturbances in war."

Bonhoeffer was unable to find evidence of exhaustion psychoses as the result of warfare, and he states: "a collective survey of war observations demonstrates the great power of resistance of the healthy brain and the insignificance of both exhaustion and emotional factors in the development of actual mental disease." With regard to the exhaustion I certainly concur, though the question of the emotional factor stands in a different category.

Aschaffenburg declares that he has seen no case in which any psychic disturbance worth mentioning has resulted from exhaustion.

Clarence Farrar concludes from his observations on Canadian soldiers that "the factor of exhaustion may lead to collapse or to acute transitory fatigue states, and if severe and protracted, to progressive physical deterioration. War experience has not established its ætiologic importance in the neuroses or psychoses. I should say that the majority of cases diagnosed as exhaustion psychoses are psychopaths who are abnormally subject to over-fatigue, or persons in whom exhaustion plays only a secondary part in a condition having other ætiological factors." The term "exhaustion psychosis" was added of late to the official nomenclature of mental diseases. This I regard as a mistake, in that it may lead many to use this term heedlessly and encourage others not to look further for deeper and more important factors.

The question of *climate* calls for no special mention as it is only part and parcel of the general hardship that a soldier has to undergo, except in the Eastern campaigns, where heatstroke, sunstroke and allied conditions do undoubtedly tend to lower mental resistance. Many of my cases with various psychopathic symptoms, but more especially those who had been in confusional states, blamed the heat largely for their breakdown. Whether or no this was a rationalization I am not in a position to say, but I should be inclined to place heat in the same category as exhaustion, that is as only being contributory.

Acute illnesses were predisposing and contributory as well. In the East there were many cases of nervous and mental trouble brought on during or as a sequela to malaria and dysentery. The toxin of malaria seems to have quite a predilection for the nervous system, and amnesic and confusional states were quite frequent in its train.

Physical traumata, such as head wounds and concussion, may lead to the exhibition of mental symptoms through definite interference with functioning or through destruction of cerebral tissue, and following on such injuries, many anomalous mental states tend to occur, fugues, amnesias, character changes and convulsive attacks being those mainly seen.

Many authorities regard pre-existing *syphilis* as a marked predisposing cause of nervous and mental disease in times of war strain. Whether this is so or not I am not in a position to say, and the point is a very difficult one to decide. The mere presence of positive Wassermann reactions in the blood does not prove that syphilis has any definite relationship with the psychosis.

Alcohol is of more importance. Though I can only trace a very small percentage—viz., 1·6 per cent.—to its definite influence, there are some who take a very different view. Lepine, in his work "Troubles mentaux de la guerre," makes the astounding statement that alcohol was the primary or sole cause in one-third of his cases, and more than half, perhaps two-thirds, were influenced by it. His observations were founded on the study of 6,000 cases, but it is difficult to see how he could come to such a conclusion. If his deductions are true, one can safely say that the cases met with in the British Army are very different. In the Russo-Japanese war the percentage was very high and accounted, it is said, for one-third of all the cases, but in the last

Russian campaign it is claimed that not a single case of alcoholic insanity had occurred.

From my point of view the question of alcohol in the causation of mental diseases requires much reconsideration. Apart from the acute intoxications and those chronic states induced by many years of excessive drinking producing a demential condition, I regard alcohol largely as only a contributory factor working with and aiding mental conflict. It tends to remove inhibitions, aids mental regression, and in the end psychological mechanisms are set in action which mostly bring about the result of having saved the individual mental pain. In more or less superficial statistical work it is difficult to make sure as to the absence or not of the alcoholic factor, but in my experience of war psychoses it is not a glaring one, and when present is frequently found not to have been a main element. In so many cases precisely the same syndrome may be met with, with or without alcohol as an adjuvant.

Mental conflict is the last but most important ætiological factor in the production of the war psychoses. Now that modern psychiatrists are more and more studying the psychology of mental diseases, they are tending *pari passu* to regard mental conflict as the "fons et origo." The mechanisms involved, the distortions and disguises which these same mechanisms have brought about, and the end results in more or less definite clinical types have been much studied and formulated in dementia præcox, manic-depressive insanity and paranoidal states.

Further research now reveals psychogenetic factors in many of the so-called alcoholic psychoses, in epilepsy, hallucinatory deliriums and prison psychoses. We understand now to some extent that the aim of these psychological mechanisms is constructive, that the patients have thereby defended themselves against internal warfare, have built a world of their own in which they feel they can live, and have in many instances obviated mental pain and self-reproach and gained their compensations. In warfare we should not be surprised to find great opportunities for mental conflicts. The battle within between the highest desire to follow the dictates of duty and honour and the individualistic wish for safety and to be out of it all, is a conflict that must occur at any rate now and again to almost every combatant, though probably not always in a fully conscious form. News from home of a disturbing nature, the separation of loved ones and the unfaithfulness of wives cause worries that one hears of in case after case of mental trouble. Exhaustion and indisposition, rendering the sufferer less able to work properly, tend to bring about morbid feelings of incompetency, unworthiness and impotency, and thus perhaps arouse past conflicts. Enforced sexual abstinence in some causes anxiety, promiscuous intercourse self-reproach, and it is probable that the close male companionship in some lights up a latent homo-sexuality which, though perhaps never becoming conscious, produces a mental conflict and may be in time a paranoidal state. Of course these mental conflicts can produce no psychosis if resolution takes place normally, but through repression and abnormal resolution havoc may be wrought, and especially in those cases whose mental soil is fertile. It is probable that in many instances alcohol is freely taken to narcotize these conflicts which might or might not have produced psychopathic symptoms without its use.

Let me pass on to give you some facts about the psychoses of the present war as deduced from the analysis of 3,000 consecutive cases of N.C.O.'s and men who have passed through my hands in under twelve months. At "D" Block, Netley, which is only a clearing hospital, all expeditionary force officers and other ranks from every theatre of war—France, Belgium, Italy, Salonica, Egypt, Mesopotamia, and Palestine—are admitted, examined, and then drafted on with a report of their case, to one or other of the British mental war hospitals, where they remain if necessary for nine months before being certified as of unsound mind and placed in an asylum as a special service patient. Those sufficiently well, though not recovered, may be sent to relations or friends if they will accept the responsibility. Since the outbreak of war to March 1, 1919, 313 officers and 11,850 other ranks from the Expeditionary Forces have been admitted. Of these, 8,361 had been under fire and 3,489 had not been under fire; 814 had previously been in asylums.

The average length of stay of each case in this hospital has only been a few days, so that any deep study of the individual has been out of the question, but what one has lacked here has been to some extent compensated for by the large numbers and wide though superficial outlook gained. Though my leisure time for such work has been very limited, I have made statistical notes on 3,000 consecutive cases, the clinical careers of which I have since followed up in my visits to the mental war hospitals. Officers have for more than one reason not been included. Increased knowledge leads to improved diagnosis but greater difficulty in labelling. I have therefore classified largely in terms of reaction types except in those cases where the clinical picture was such that one could justly use a text-book heading.

My results show the following figures:—

ANALYSIS OF 3,000 CONSECUTIVE CASES.

	Number	Per cent.
Under fire	2,289	76·3
Not under fire	711	23·7
Recovered	1,376	45·8
Improved	387	12·9
No change	1,168	38·9
Died	41	1·3
Discharged from service	1,818	60·6
Returned to duty	215	7·1
Repatriated	278	9·2
Sent to asylum	617	20·5
Still in hospital	23	0·7
Not traced	20	0·6
Previous attacks	293 (?)	9·7 (?)
Insane heredity	539 (?)	18·0 (?)
Had recent shell shock	123	4·0
Alcoholic history	393	13·0
Committed suicide	3	—
Attempted suicide	105	3·5
Escaped	5	—

Classification.

	Number	Per cent.
Dementia præcox	598	20·0
Manic-depressive		
Depressive phase	250	8·3
Manic phase	180	6·0
Simple depressed states	194	6·4
Confusional states	401	13·3
including		
Acute confusion	116	3·8
Simple paranoid states	260	8·6
Acute hallucinatory paranoia	233	7·7
Pure paranoia	10	0·3
Mental deficiency	388	13·0
General paresis	142	4·7
Alcoholic psychoses	49	1·6
Anxiety hysteria	46	1·5
Epileptic psychoses	38	1·2
Psychopathic inferiority	40	1·3
Traumatic confusion	22	0·7
Amnesia and amnesic fugues	22	0·7
With organic brain disease	22	0·7
Associated with acute infective disease	24	0·8
Acute hallucinatory delirium	5	0·1
Unclassified	76	2·5

Dementia præcox, as might be supposed, accounts for the largest percentage of these war psychoses—viz., 20 per cent. It is often impossible to be certain that this condition exists until prolonged observation has taken place, as so many of the other mental reactions of war at first seem akin to it. So many show marked apathy as a leading symptom that in the absence of other diagnostic factors, time often alone can be the test, and especially is this so as the previous history of the patient is so frequently not obtainable. I have constantly been deceived in this way and other psychiatrists have had similar experience. The different types, hebephrenic, catatonic, and paranoid, are met with as in civil practice. Nothing special is to be said of these but naturally the content of their delusions and hallucinations often have a military colouring.

The depressive reactions had a percentage of 14·7, of which 6·4 per cent. were more or less *simple depressed states* and 8·3 per cent. conformed fairly typically to the depressed phase of the manic-depressive psychosis. In all previous wars depressive states have been much in evidence, and it seems natural that the circumstances of a soldier's life should tend in this direction. The loss or diminution of the herd influence must arise at times when the individual feelings come to the fore and introspection comes about with its morbid tendencies. Home worries one finds a prevalent factor in the engendering of mental breakdowns even in those who had shown no previous psychopathic characteristics. The constant stern demands of duty, though hearts are sore and souls in pain, must produce mental conflicts to which rational adjustment is difficult. As the emotions in such an environment must so largely be repressed, is it any wonder than many develop morbid symptoms? Depressive anxiety and morbid apprehension are seen in the milder cases and intense depression in the more severe. The feeling of diffuse anxiety is so frequently met with that Lepine makes a definite class of these cases under the term "anxious insanity," which he thinks more fitly describes them than melancholia. Self-accusation and the symptoms of a morbid conscience are constantly in evidence and not seldom can they be traced to auto-erotic associations upon which many think their pathology depends. It is an interesting and debatable point as to whether many of the anxiety conditions may not be due to ungratified sexual desire according to the Freudian theory. One sees no reason why this should not be in some an ætiological factor, especially at those times when inaction prevents the drafting off of energy. A very large number of depressions seem only secondary to paranoid ideas. Some psychiatrists would not hesitate to place such cases in the manic-depressive group though no retardation of thought is shown, while others regard the paranoid reaction as essentially primary and the depression only a natural sequence. The only British statistics published at present are those by Hotchkiss, of the Dykebar War Hospital, who found out of his nearly thousand cases about 14 per cent. of the depressed manic-depressives, which agrees with my findings if the simple depressed states are included.

Manic types of reaction were comparatively infrequent—viz., 6 per cent. They require no special mention.

The confusional states were extremely common and this is probably why it has been superficially supposed that some exhaustive factor must be the main causative agent. The percentage amounted to 17·5, of which 13 per cent. were simple confusional states from stupor to slight obfuscation; 3·8 per cent. belonged to the type of acute confusional insanity; and 7 per cent. were traumatic. A certain number of these cases were patently due to toxic influence and followed upon definite bodily illnesses.

As I have already mentioned, the malarial poison was a common offender and every convoy from the Eastern sphere contained some patients suffering from a mild confusion with which usually a more or less severe amnesia was shown. These generally had been acute or subacute at the onset and had become somewhat chronic. A few presented themselves in almost stuporose conditions.

The acute confusions differed in no way from those seen in civil life, and without a more definite history it was often difficult or impossible to say whether the cases would prove to be dementia præcox when the acute onset subsided. Acute hallucinatory states were brought about more especially after psychic shocks, presenting the symptoms of an acute hysterical dissociation of only a temporary nature. Traumatic cases, such as the concussional, showed nothing special, but, as with nearly all psychotic symptoms, there would be a war colouring to the picture. The pathology of many of these types of confusion is often obscure, and the war psychiatric literature up to the present hardly throws any light on the subject. The French writers either vaguely speak of the effect of emotion, or state that there need be no astonishment at the different varieties of confusion seen in war patients because of the prevalence of the alcoholic factor. Toxic factors are probably accountable for many cases, but what these toxins may be is by no means always obvious. Many confusions are undoubtedly purely psychological in origin, such as those we see commonly associated with the mental defects. Mal-adaptable mentalities when called upon more or less suddenly to face new and difficult situations will often naturally react in a confusional way from conflict of impulse. At times what is taken for confusion is really a dream state resulting from an inherent desire to negate reality.

Paranoid Reactions.—A pronounced feature of war mental reactions is the great prevalence of a paranoid trend. It seems to permeate into the clinical picture of a very large percentage of cases, even where the outstanding features are widely different. It tends to colour the mental defect and the manic-depressive types, while in the dementia præcox cases it is as usual a prominent early symptom. It is seen in full bloom constantly in an acute and often temporary paranoid psychosis. Only a vague feeling of suspicion may be present, or an indefinite sense that everybody is against the patients, or it may develop still further into a definite but often brief unsystematized persecutory state. In my analysis I find 16·6 per cent. of paranoid cases, of which 8·6 per cent. were simple paranoid states, 7·7 per cent. were somewhat acute and hallucinatory, while only *0·3 per cent.* belonged to the pure paranoid group, and these had mostly existed prior to enlistment. I think that the soldiers' environment and experience tend largely to bring about this form of reaction.

The psychological mechanism of projection is common enough in everyday life, but seems to be brought into use as a defence reaction much more under the severe conditions of war. The mental defect often has substantial grounds for his persecutory ideas. He is bullied, made game of, and tends to lead an existence which brings about the natural conclusion that everyone is against him. The whole trend of iron discipline fosters in some the idea of persecution, which becomes exaggerated in a mind that is morbidly disposed and that has become individualistic. When duties are not performed satisfactorily the bad workman blames his tools; the soldier may take up a similar attitude. Morbid introspection leads to the arousing of old self-reproaches, conscious and unconscious, the resulting conflict ending in projection. The history of a typical case is that the man is seen to become asocial, avoids his comrades and gets depressed and sleepless. Casual remarks elicit the fact that he thinks that everyone is against him, and after a time he thinks he is persecuted by a definite group. He imagines he is regarded as a spy and as an object of suspicion. Hallucinations may or may not further complicate the picture. If they develop, the "voices" threaten "to do him in," call him filthy and obscene names, and accuse him of the most immoral acts. This clinical picture is by no means a new one, and is akin to the state of so-called alcoholic hallucinosis. In many instances alcohol does enter into the history, and these states are usually regarded as alcoholic, but precisely the same syndrome is produced without this drug, and it is seldom that any real toxic signs or symptoms are evinced. Out of my 233 cases of this type only eighty-two had an alcoholic history as far as one could tell. I regard alcohol here merely as a contributory factor, aiding mental regression, helping to remove inhibition, and thus more fully precipitating the symptoms. It is often easy to see that it was taken because of the mental conflict as a refuge and narcotic. The prognosis is, I believe, fair, recovery usually taking place with insight.

The pathology of these cases requires much more elucidation. The Freudian school believe that homosexuality is a basic factor in paranoiac states. It certainly must be patent to any observer that sexual matters enter very largely into the hallucinatory content of these patients, and we must from this presume that mental conflicts of a sexual nature have an ætiological relationship at any rate with the acute form of this psychosis. Considering that this kind of psychopathic reaction is as common as it is on active service, it would be suggestive to investigate the theory that the herding of men together in the army, where heterosexual desires are largely excluded from being gratified, tends to arouse a latent homosexuality against which the personality defends itself by projection. That this hypothesis has some grounds for support is not improbable. As Shand has pointed out in a paper read before the British Psychological Society last year, suspicion is an emotion which, though so prevalent, has been enormously overlooked and neglected by psychologists in the past. There is much interesting material on this point for investigation in war psychiatric work.

The more psychiatrists see of *general paresis* the more they find that the correct diagnosis depends upon a study of a combination of the mental symptoms and the organic nervous signs, plus the serological findings. In my clearing hospital it was not therefore possible to be by any means sure how many cases were passing through, and, superficially one found that many wrong conjectures had been made when the cases were afterwards followed up. As has been pointed out by Major Eager of the Lord Derby War Hospital, Warrington, many shell-shock cases have presented similar signs for a time and were only differentiated by careful further investigation. It is a very debatable question whether the stress and strain of war does or does not tend to be a factor in hastening the advent of this disease. One must bear in mind that in the Army we have a lessened number of men between those ages in which general paresis usually manifests itself—viz., from 35 to 45 years. In civil life the percentage is about 11, whereas European armies show an average of about 7 per cent. during peace time. During the Russo-Japanese war the Russians showed a percentage of 5·6 and in the analysis of my much larger number the percentage is only 4·7. It seems, therefore that we have no ground for supposing that active service increases the actual number of cases, but the age incidence perhaps tends often to be somewhat earlier. Out of the 142 cases ten were under 30 years, the lowest being 27 years, twenty were 35 or under, and thirty-one were under 40. The period between the contraction of syphilis and the onset of paretic signs seems also to be somewhat shortened in a good many instances, though what the relationship is between this and war experiences is only pure conjecture.

Mental Deficiency.—Perhaps the first thing that would strike the average observer if he saw a parade of my mental cases from overseas, would be the large number who present the outward and visible signs of mental deficiency upon their faces. Though facial expression and features are but poor and superficial guides in this direction, in the main he would be right in his assumption that a large proportion of the men had a subnormal mentality. It is true that the expression of those who are confused and apathetic tends to lend the countenance an appearance which is deceptive in this direction, and it is surprising how when the confusion disappears and more interest is taken in the environment, the previous impression of intellectual defect vanishes. I am inclined to think that the question of mental deficiency—using the term in its wide sense—is one of the most important with which recruiting authorities have to deal. My statistics show a percentage of 13 of pure mental defects of all grades, many of whom had some slight pathological symptoms temporarily superadded. It is astonishing to note the length of service of some of these men who are sent home with reports of their uselessness, and their having been a danger to themselves and others. But on tracing their history one so often finds that they were never permitted to use a rifle and for a long period had only been performing menial duties, and had only perhaps broken down when the slightest responsibilities had been assigned them or some slight strain encountered. A large number of such men were incorporated in the Labour Battalions, where it was presumed that a mental defect was of small account. We here see the idea carried out that if a man can do any work in civil life, he can do that work in the army, and can do it overseas. Practice, though, does not bear out any such theory, as any psychopathologist would have predicted. Poor-witted farm labourers who have lived in the most simple surroundings all their lives cannot adapt themselves for long in the army organization, and still less so when having to work under shell fire. With the games their comrades play on them and the stern treatment meted out to them by their N.C.O.'s, is it any wonder that they develop some confusional symptoms, that they get persecutory ideas, which often have some true basis, and show stuporose and other psychopathic states?

Mental adaptability is something that one cannot weigh in a balance, measure in mathematical terms, and predict with certainty. How hard it is to prognosticate in such a question is shown by the surprising number of mental defects who do somehow or other adapt themselves normally for a really long time before breaking down. One can therefore have some sympathy with the military authorities if they take up the attitude that they require the service of every available man, that no one can say with any certainty how long a mental defect may be useful, and that it is worth their while to risk the recruiting a man on the chance of his being able to serve the State for some fair period of time. The psychiatrist tends only to see one side of the picture, and that perhaps he also takes too academic a view is possible.

This has an important bearing on the swelling of an already enormous pension list, which might have been to some extent obviated with more care. Many of the cases were found to be purely mental defects from fairly low grades to morons, while many others on this basis have superimposed symptoms. Some amount of confusion with memory defect, perhaps leading to fugues, was perhaps the commonest type met with, but transient depression or excitement with or without paranoidal ideas were met with as well. The medico-legal side of the defect is of importance, for, as may easily be imagined, they are constantly and fruitlessly punished for minor delinquencies, and only later found to be partly responsible.

The true *toxic alcoholic psychoses* amounted to only 1·6 per cent. In many of the paranoid states an alcoholic history was obtainable, and ordinarily these are classed under this heading, but I do not think that this is scientifically correct. Many modern psychiatrists are taking this view, and regard alcohol as an ætiological factor in the production of mental disease as overrated, incidence being confused with cause. Such a text-book type as alcoholic hallucination requires its pathology remodelling in the light of modern psychopathological knowledge. Important psychic factors are always present; alcohol is not a necessary factor in the production of the psychosis, usually the sensorium is clear, and no definite toxic signs are observed. The acute intoxications, chronic demented states and Korsakoff's syndrome, stand in quite a different category.

Psychoses associated with epilepsy—the only psychosis inquired for by recruiting doctors—showed merely a percentage of 1·2. Epileptic confusion was the main symptom seen. Many cases of epilepsy transferred home were found on investigation to be really psychoneurotic in origin.

Other abnormal states showing small percentages require no special mention. A certain number were found to be purely *psychoneurotic* and transferred at once to the neurological section of the hospital.

A few words may be said on the question of *suicide* as met with under active service conditions. Of my 3,000 cases 105 attempted the act and three were successful in thus ending their lives at the War Mental Hospital to which they were transferred. First as to the means employed. It is presumably true that different individuals tend to choose the method according to their occupation, which may suggest a certain mode, and that there are good grounds for thinking that definite psychic factors aid in this choice, and that mental analysis would often reveal them. It has been stated that the soldier by preference shoots himself, whereas among my cases this method was quite exceptional and throat-cutting with a razor was almost universally employed. It is a moot point whether the mechanical difficulties involved in using the rifle is sufficient to explain why it is so seldom chosen for this purpose. The majority of suicidal attempts were among the manic-depressives, and others were acutely hallucinated paranoiacs, who, driven to desperation through the continuous accusing voices, sought an end to their existence. A few occurred in quite temporary confusional states, in which one could trace no previous depression, nor evidence of mental conflict. The act was sometimes premeditated, and sometimes not, and amnesia for the act itself was extremely frequent. Such memory gaps are common enough when certain antisocial acts are performed, and they become necessarily of great medico-legal interest.

Though the genuineness of these amnesias are often called in question, there is no doubt that they do often truly exist, and doubtless the memory could be recovered by special means. Through the conscious personality, repression and dissociation take place as a result of the mental conflict, and the suicidal act is performed while in this dissociated state. The same pathological basis exists as in the amnesic fugue. Suicide mainly involves the absolute negation of reality. It is the furthermost limit of that flight from reality which in some degree or other tends perhaps to be the most fundamental human trend. The psychology of suicide requires more studying. It is much too often taken at its surface value. Wholey has made some interesting observations on this subject in discussing a case of an alcoholic toxic psychosis of his.[1] He says:—

> "The regularity with which we find the alcoholic attempting suicide by throat laceration lends confirmation to the theory that a 'birth phantasy' determined the manner of suicide. Such an interpretation of the psychology of the alcoholic is in keeping with the theory of his homosexual fixation. . . . It is to be noted that it is not the affect-depression of the melancholic which drives these patients to suicide but an overwhelming urge to escape from an imminent death attended by the most hideous torture and mutilation. . . . The alcoholic's 'torture' practically always includes mutilation of the genital organs."

There is great reason to believe that in many, if not all suicides, factors in the unconscious mind are mainly responsible, but I regret I cannot follow Wholey's meaning when he connects throat laceration with the idea of "birth phantasy," which I find is also spoken of by no less a psychiatric authority than William White, of Washington.

Ernest Jones, in speaking of the fear and desire for death in the war psychoneuroses says[2]:—

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[1] "Revelations of the Unconscious in a Toxic (Alcoholic) Psychosis," *Amer. Journ. Insanity*, 1918, lxxiv, pp. 437-444.

[2] "Papers on Psycho-analysis," 1918, p. 580.

> "The conscious mind has difficulty enough in encompassing in the imagination the conception of absolute annihilation and there is every reason to think that the unconscious mind is totally incapable of such an idea. When the idea of death reaches the unconscious mind, it is at once interpreted in one of two ways, either as a reduction of essential vital activity, of which castration is a typical form, or as a state of nirvana in which the ego survives, but freed from the disturbances of the outer world."

These ideas are very suggestive and mark a distinct advance in our conception of the pathology of suicide.

Though I am in a position to give the ratio of the number of mental cases admitted to D Block to the *average* number of troops on active service during the year 1917, such a ratio would be quite valueless and misleading, since because of wounds, death, illness and other reasons, this population was a constantly changing one and no exact figures are obtainable of the true number of men who visited abroad during that time. Any comparison therefore with mental disease occurring in civil life during the same period is out of the question and especially so as separate statistics have not been made for the latter with regard to the special age-period of 18 to 40 years, for with that period only is the soldier mainly concerned.

The recovery-rate would probably be found to be somewhat higher on further and later investigation as some of the cases had been repatriated at an early stage and cannot now be traced. It should be noted, too, that by eliminating the 388 mental defects the recovery-rate is raised to 52·6 per cent. The organization for the transference, housing and treatment of the mentally afflicted soldier has for a long time run very smoothly and these patients can have little cause for complaint. The gradually increasing numbers put a great strain on the hospital accommodation and fresh institutions had to be taken over for this purpose from time to time. Perhaps the main defect that has existed was one difficult to ameliorate—viz., that we had not sufficient trained psychiatrists to deal with the work efficiently.

I hope that in the near future we may in England be able to adopt some such mental hygiene movement as now exists in the United States, which already has borne such admirable and fruitful results. At any rate, through this war, neuro-psychiatry has a more hopeful outlook both for physician and patients.

Section of Psychiatry.

President—Dr. WILLIAM McDOUGALL, F.R.S.

War Neurosis: A Comparison of Early Cases seen in the Field with those seen at the Base.[1]

By WILLIAM BROWN, M.A., M.D.Oxon., D.Sc.Lond.

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(ABSTRACT.)

[This paper was printed *in extenso* in the *Lancet*, May 17, 1919, p. 833.]

IN a recent communication to a medical periodical[2] I have indicated the principal methods of treatment which I found useful in dealing with early cases of war neurosis while acting as neurological specialist to the Army of the Somme front. In the great majority of these acute cases the method of *rational persuasion* sufficed to produce a cure if preceded by a thorough physical examination and supported by the arousal of feelings of confidence and enthusiastic expectation of a favourable result. Where earlier emotional shocks and mental conflicts had already weakened the patient's powers of resistance to the stress and strain of war the method of *mental analysis* was found helpful. Finally, in cases showing extensive amnesia, involving dissociation of intensely emotional psychic states, the method of *light hypnosis, under adequate safeguards*, was invariably successful in restoring the lost memories and freeing the patient from subconscious emotional obsession.

My experience with more chronic cases in neurological hospitals in Great Britain has impressed me with the great difference produced by lapse of time in these functional nervous disorders and in their reaction to different forms of treatment. Several of my officer patients in France were again my patients at Craiglockhart, and notes on the further history of many other of my patients of the Somme have come into my hands. It seems, therefore, worth while to attempt a comparison of these earlier and later cases. Their differences help somewhat to explain the differences of opinion held by equally competent observers on diagnosis and treatment.

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[1] At a meeting of the Section, held April 8, 1919.

[2] *Lancet*, 1918, ii, p. 197.

RETURNS TO DUTY IN THE FIELD.

As regards the cases seen in the field the percentage of returns to duty varied, as might naturally be expected, according to the nature of the fighting. It was at the time of a push that this percentage became highest. Thus, whereas my average percentage returns over a period of sixteen months was 70, at the time of the Cambrai push in November and December, 1917, I was able to return 91 per cent. to duty. This was due to the number of exceptionally light cases that are sent down at the time of a push, to be out of the way. Neurologists in other armies have no doubt obtained equally high percentages.

But these percentage returns to duty are of no help in deciding the relative merits of different methods of treatment, for the simple reason that the *same* method, apparently, was used by all of us with these lighter cases—viz., the method of persuasion. For my own part, at any rate, I reserved the other therapeutic methods mentioned above, almost without exception, for cases whom I intended to send down the line. It is a study of these cases which is the more helpful in contributing to a scientific knowledge of our subject. But first let us consider the various types of psychoneurosis as they arrive in an advanced neurological centre at the time of a push.

NEUROLOGICAL CASES DURING A PUSH.

The majority of the nerve cases that came down during the first forty-eight hours after our tanks and infantry went over at Cambrai in November, 1917, were very light. They were either old cases of "shell shock" who had lost their nerve again at the prospect of being heavily shelled, or else men constitutionally weak of nerve and lacking the power to pull themselves together in face of an emergency. They came down in lorries as walking cases, and made a sorry show in the reception-room, with their hanging heads and furtive looks. They gave the impression of men who had, at least temporarily, lost their self-respect.

Many of them were keeping up, with obvious effort, rhythmical tremors which had no doubt been involuntary and irrepressible some hours before, but were now within the field of voluntary control. By distracting these cases with a rapid sequence of questions as to the origin of their disability, I was able to bring the tremors to an end, and by treatment during the next few days made the cure a permanent one. These men returned to the line within a week. Others suffered also from tachycardia and genuine headache and vertigo, and needed a more prolonged rest in hospital.

On the following days more serious cases began to arrive, many of them stretcher cases. These had been concussed or buried by the explosion of shells quite close to them, and some of them had been rendered unconscious for a longer or shorter period of time. A few were still apparently unconscious of their surroundings, although their minds were probably in a dream state rather than an absolute blank.

[Here were given descriptions of a few typical cases, of which the following is one]:—

A WALKING CASE: DEAFNESS, MUTISM, AND AMNESIA.

Case C.—A walking case this, but unable to speak or hear. He is somewhat lethargic, but on being given pencil and paper writes a description of the origin of his injury. He has complete amnesia for events immediately following upon the shell explosion up to the time when he reached the advanced dressing-post. Slight tremulousness and occasional headaches complete the list of his symptoms. I place him on a couch and show him written instructions to close his eyes and think of sleep. After an interval of about two minutes I make a sudden noise by banging two books together. His eyelids flicker, and I find that his power of hearing has returned to him. I then proceed to give him suggestions audibly, urging him to continue thinking of sleep, to give himself up to sleep, and saying that I am about to put my hand on his forehead, and that the moment I do so all the events of his accident, which he has forgotten, will return to his mind with hallucinatory vividness. The result is that the moment I touch his forehead he shouts out, using the same words that he did while under fire, and giving evidence of the same emotion of fear that he must have experienced at that time. After he has worked off all this emotion I remind him of where he is (in hospital), who is speaking to him (myself), &c., and after giving the suggestion that he will continue to remember everything, I wake him up and find that his main neurotic symptoms—deafness, mutism, and amnesia—have disappeared. I send him back to the ward to have a good sleep. He makes an uninterrupted and complete recovery during the next few days.

CAUSATION: DISSOCIATION OF PSYCHO-PHYSICAL FUNCTIONS.

Treatment, in the form of vigorous counter-suggestion and rational persuasion, was given to all the patients immediately upon their arrival in hospital, and was continued unceasingly during their stay, with the aid of the sister-in-charge. Consequently, in the majority of cases the functional symptoms disappeared or became gradually of less severity right from the beginning. But in a few of the more resistant cases I was able to observe the tendency for more severe symptoms to make their appearance after a "period of meditation," as Charcot called it, and many of the other cases seem to have shown the same "incubation process" during their passage from the line to the neurological centre. It is particularly noticeable in the case of motor symptoms such as paraplegia, hemiplegia, and loss of speech, and these are just the symptoms the onset of which seems, at least on a superficial view, to be completely explicable in terms of Babinski's[1] theory of suggestion. The idea of loss of power has been implanted in the patient's mind at the moment of mental confusion and loss of emotional control produced by the shock of the shell explosion, and gradually realizes itself during the following few hours or days.

But, as Myers[2] has pointed out, this theory cannot explain the loss of memory which is so frequent a symptom in the war neuroses. Nor does it explain the sudden or gradual onset of vaso-motor and secretory symptoms which unless treated, and too often in spite of treatment, persist for long periods, although there is often no wound present to give one the excuse of classifying them under the heading "reflex nervous disorder." And there is now a large and growing body of scientific opinion which regards these "reflex nervous disorders" as entirely functional in nature and curable by psychotherapy.

As regards loss of memory, it is a remarkable fact that Babinski does not once mention this symptom in his recent book on hysteria. Had he devoted more attention to it and to other outstanding *psychological* characteristics of functional nervous disorders, his final theory might possibly have been less clear-cut but surely more intellectually satisfying.

Viewed from the psychological point of view, hysterical disorders all fall under one heading, as examples of *dissociation* of psycho-physical functions (walking, speaking, hearing, remembering certain experiences, &c.) following upon a diminution or loss of higher mental control. One school of thought would explain this dissociation as the result of conflict between opposing and incompatible emotional tendencies and as characterized by repression of one of these tendencies. Others consider that a strong emotional shock is capable of bringing it about in those who are hereditarily predisposed, and may even produce it in a normal individual, if sufficiently intense. On the other hand, Babinski holds that "hysterical symptoms and violent emotions are incompatible."[1] It is perfectly true that an intense emotion, such as anger, may overcome a functional dissociation. I have made a functional paraplegic walk by the simple expedient of inducing him to lose his temper with me. But this fact is in no real contradiction with the theory of the emotional origin of the disease, especially if the originating emotion was of such intensity as to produce a state of stupor—a result often observed in this war.

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[1] Babinski and Froment, "Hysteria or Pithiatism" (Eng. trans.), p. 41.

[2] C. S. Myers, *Lancet*, January 11, 1919.

[Here follow descriptions of cases showing delayed onset of symptoms. The most satisfactory explanation of the "period of incubation" is that it corresponds to a period of subconscious emotional development and not to the working merely of suggestion.]

AMNESIA.

In 15 per cent. of all the cases seen by me in the field there was pronounced loss of memory, combined with the different varieties of physical functional symptoms (paralysis, mutism, deafness, contracture, &c.). My method of dealing with these cases was to restore the memory in a state of light hypnosis, taking care to encourage the revival of the emotional elements of the forgotten experience in all their original intensity. The result was that the accompanying physical symptoms disappeared of themselves, with more or less completeness according as the emotional accompaniments of the recalled memories were more or less vividly re-experienced *as a present hallucinatory experience*, without the need of making specific suggestions that they should disappear.

In my first *Lancet* article I explained this on the theory that the emotional memories were *repressed* memories, and that the physical symptoms were their physical equivalents, the repressed emotion having been "converted" into physical innervations in accordance with Freud's theory of "conversion hysteria." On again reading through all my notes of these cases I feel inclined to suggest another hypothesis for many of the cases—viz., that the reinstatement of intense emotion acted physically in overcoming synaptic resistances in specific parts of the nervous system, and so put the nervous system into normal working order again. The effect is more potent than that of, for example, an electric current would be, since it is selective and occurs only in just those parts of the system concerned with the production of the symptoms. (Cf. McDougall's theory of the physiological factors of dissociation and hypnosis.) The theory of abreaction would still apply to the cases where mental conflict and repression of emotional tendencies had taken place at the time of the shock or injury. But in many cases the conditions of the injury appear to have excluded this mechanism.

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[1] Babinski and Froment, *Ibid.*, p. 43.

This modification is one of theory only. In practice I still regard the recall of lost emotional memories with hallucinatory vividness as a most beneficial form of treatment for patients seen shortly after the onset of their symptoms. It redintegrates the mind[1] and by again linking up the physical manifestations of emotion with their psychical counterpart enables the former to come to a natural end when the emotion has been worked off, instead of persisting as the relatively permanent physical manifestations of the neurosis.

TREATMENT OF AMNESIA IN FRANCE AND ENGLAND.

In France I succeeded in clearing up every case of amnesia by means of light hypnosis. Even cases of obviously physical concussion with retrograde amnesia responded to this form of treatment. Thus, an Australian soldier was brought into my ward with complete loss of memory, his field medical card being marked "Identity unknown." Through hypnosis I discovered that he had been pushed out of a motor lorry by irresponsible companions, and rendered unconscious. He was taken to Amiens, where he seemed to recover. Later on he was found wandering and completely unable to give any account of himself. He had previously been exposed to very heavy shelling and was of a typically hysterical mentality.

In England the results were very different. In only a small proportion of cases could I recover lost memories by mild hypnotic means. Like the other neurotic symptoms the amnesia appeared to have become more fixed and intractable. In the few cases in which the hypnotic state was induced and lost memories were recalled, it was extremely rare to find the other neurotic symptoms greatly affected thereby. Thus I hypnotized a deaf-mute suffering from extensive amnesia, and eventually recovered all his lost memories, but he remained deaf and dumb throughout this time and eventually recovered speech and hearing in a dream at night! In acute cases near the line such failure never occurred.

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[1] Cf. Myers: Op. cit.

What was lacking in my experiences in England was the emotional abreaction, or the recall, with hallucinatory vividness, of the emotional tone of the lost memories. At Craiglockhart I used a modified form of the method with three of the officer patients and succeeded in producing the abreaction. In each of these three cases I had the satisfaction of seeing the physical symptoms—paraplegia of old-standing, with headache, painful contracture of right arm, and very bad stammer, respectively—alter, increase, and then disappear. These three officers all suffered from intractable insomnia. I therefore sent them to sleep at night by means of light hypnosis—twice only—and treated them by means of mental analysis during the day. In two out of the three cases the "emotional upheaval" took place at night, the patients re-experiencing their original shock in all its vividness and the physical symptoms then disappearing. In the third case the abreaction occurred during the day. They all made good recoveries, although they were chronic cases of many months' standing and every other conceivable method had been used with them in vain.

BLOOD PRESSURE: DISTURBANCES OF ENDOCRINE GLANDS.

I made measurements of blood pressure in a series of 42 consecutive cases of severe neurosis in the field, using the auscultatory method with a Tycos sphygmomanometer. The frequency distribution of the systolic pressures was as follows:—

Under 110 mm.	110-120	120-130	130-140	140-150	Above 150	Total
1	4	9	13	9	6	42

It will be seen that more than one-third of the cases had a blood pressure > 140 mm., and much more than one half had a blood pressure > 130 mm. The normal blood pressure of a healthy man of about 30 years of age is generally given as 120 mm. to 130 mm. I correlated these blood pressures with the corresponding pulse-rates and obtained a zero correlation coefficient. These results may possibly indicate a preliminary increase of adrenalin output in some of the severer cases of war neurosis.

In like manner one might infer from the combination of tachycardia with fine tremors of the outstretched hands found in so many cases a disturbance of thyroid secretion. In two or three cases I also noticed a tendency to exophthalmos and thyroid enlargement, but I was surprised at its rarity, in view of the emotional ætiology assigned to it in the text-books.

The importance which Sir Frederick Mott has attached to disturbances of the endocrine glands in the symptomatology of the war neuroses is likely to be more and more emphatically justified as the results of observations made by different observers in this field of research are accumulated and compared. The same holds good of Mott's views with regard to the rôle played by the physical manifestations of the emotions in determining the form which the war neuroses take. The far-reaching extent of the bodily changes, involving cardiovascular and glandular activity in addition to that of the voluntary and involuntary musculature, explains the intractableness of so many of these cases, to which the diagnosis of hysteria in its ordinary sense would hardly apply. Nevertheless, if the originating cause was a mental disturbance, we may, theoretically, expect that psychotherapy will help to readjust the balance once more even in such widespread physiological disturbances, and practical success, although slow and partial in many cases, seems to justify this expectation.

AFTER-HISTORIES OF PATIENTS TREATED IN THE FIELD.

I have a series of twenty-two completed after-histories of patients whom I treated in France. I had used light hypnosis with all these cases, which were severe, and cleared up their amnesias and other pronounced hysterical symptoms (mutism, paralysis, spasmodic contractures, &c.) by this means. In only one of these cases did relapse or the appearance of other hysterical symptoms occur later on. This case suffered from deaf-mutism, with extensive amnesia following upon exposure to the explosion of a shell, all of which symptoms cleared up completely. He eventually reached a neurological hospital in the north of England suffering from weakness of the lower limbs. Mental analysis brought to light earlier pre-war mental shocks, and when these had been talked out all functional symptoms completely disappeared.

It was gratifying to find that fifteen of these cases (66 per cent.) eventually returned to duty.

One of them had been buried in a dug-out and suffered from amnesia for the events of the accident, hyperæsthesia of the right side of the neck corresponding to the second and third cervical areas, and fixation of the head owing to tonic contraction of the neck muscles.

Another had fallen into a shell hole full of mud, and had been dragged out by traction on the left arm. Immediately thereafter his left arm became completely paralysed, with anæsthesia, vasomotor disturbances, and exaggerated tendon reflexes. There was evidently organic trouble, due to traction on the brachial plexus, but this was overlaid by a considerable degree of "functional" disturbance. The patient was very easily hypnotized, and then lived through his painful experiences once more, showing some movement of the arm while doing so. This treatment, helped out by physical methods, produced a great improvement in his powers of movement and sensation during the following few days. Like the preceding case, this patient made a complete recovery in England and returned to duty.

While working in a London hospital I saw a similar case of monoplegia which had not been treated before reaching England. The paralysis was still complete, and improvement under treatment took place much more slowly, although the final result was satisfactory.

The general conclusion which I would draw from these cases, and from a few others whom I have myself treated at Craiglockhart after having previously had them as my patients in France, is that the early recall of submerged emotional memories by my method of modified light hypnosis not only removes the accompanying functional symptoms without danger of consequent relapse, but also greatly shortens the period of convalescence which these severe cases need before final discharge from hospital. If again subjected to great strain, no doubt these patients would succumb more quickly than they would have done had they not experienced their original shock. But this holds good of *all* methods. One does not need to work long in the field to discover this fact. Twenty-one per cent. of my Cambrai cases had been in neurological hospitals (not my own) before. It should not be brought forward as a criticism of any method where *severe* nervous disorders are concerned.

MENTAL ANALYSIS: AUTOGNOSIS.

Patients seen at a late stage of their illness show the well-known fixation of symptoms so conspicuous by its absence at the front. But more serious than the symptoms themselves is the patient's state of mind. A distorted view of his illness has developed and has become linked up by numerous bonds of association with earlier emotional incidents of his life equally misunderstood by him. We have here to deal with the preoccupations of the neurasthenic rather than with the dissociation, or, as it were, mental carelessness of the hysteric.

The method to be employed is that of long persuasive talks with the patient, such as Dejerine advocates, and Rows, Rivers, and others have adopted in England, in the course of which one enters into his past mental conflicts and worries, explains fully the origin of his present symptoms, and helps him to see both the past and the present experiences in their right proportions. This analytic method aims at giving the patient a true insight into his mental condition, and I would therefore call it the method of *autognosis*. Hypnosis may often be used as a supplementary aid in the course of the analysis, to bring up earlier emotional experiences with the requisite vividness.

Examples of the application of this method are only convincing if reported in full, for which I have no space. It is only needed for the more intractable chronic cases of war neurosis, when it may extend over months. In the majority of acute and subacute cases these prolonged analyses are certainly not necessary. Nevertheless it is the most complete of the purely psycho-therapeutic methods, and theoretically the other methods (exclusive of mere suggestion) might be regarded as abbreviations of it.

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Section of Psychiatry.

President—Dr. WILLIAM MCDOUGALL, F.R.S.

On the Problem of Psychogenesis in Mental Diseases.[1]

By C. G. JUNG, M.D., LL.D.

WHEN I venture to discuss the problem of psychogenesis in mental disease I am quite conscious of the fact that I am touching a question that is not exactly popular. The great progress in the realm of brain anatomy and in that of pathological physiology, and the general prepossession in favour of natural science to-day, have taught us to look out always and everywhere for material causes, and to rest content having found them. The ancient metaphysical explanation of Nature has become discredited on account of its manifold encroachments and errors, so much so that the value of its psychological viewpoint was lost. In psychiatry in the first decades of the nineteenth century the metaphysical explanation of Nature ended in a moralistic ætiology. This ætiological theory explained mental disease as a consequence of moral faults. In the time of Esquirol psychiatry became a natural science.

The development of natural science brought us a general view of the world—viz., that of scientific materialism, which, considered from the psychological standpoint, is a great over-valuation of the physical cause. Thus scientific materialism as an axiomatic viewpoint refuses to acknowledge any other causal connexion than the physical one. The materialistic dogma in its psychiatric formulation runs as follows: "Diseases of the mind are diseases of the brain." This dogma still prevails even to-day, although philosophic materialism is already beginning to fade. The almost indisputable validity of the materialistic dogma in psychiatry essentially depends upon the fact that medicine as a study is a natural science, and that the alienist as a physician is a natural scientist. The medical student, being overburdened with professional studies, cannot allow himself to make digressions into the faculty of philosophy. Thus he is subjected exclusively to the influence of materialistic axioms. As a natural consequence researches in psychiatry are concerned mainly with anatomical problems, in so far as they are not preoccupied by questions of diagnosis and classification. Thus the alienist generally considers the physical ætiology to be of primary importance and the psychological ætiology of secondary and merely subsidiary importance; and because of this attitude he keeps in view only the causal connexions of the physical kind, and overlooks the psychological determination. This is not a position in which one can appreciate the importance of psychological determinants. Physicians have often assured me that it was impossible to discover any trace of psychological conflicts or of similar psychogenic matters. But just as often I found they had noted carefully all the incidents of a physical kind, and had failed to note all those of a psychological kind, not on account of negligence, but because of a typical undervaluation of the importance of the psychological factor. Once I was called in consultation in a case in which two well known nerve specialists had diagnosed sarcoma of the membranes of the spinal cord. The patient, a woman aged about 50, suffered from a peculiar symmetrical rash in the lumbar region, and from fits of crying. The physical examination made by the doctors was exceedingly careful, as was the anamnesis. A piece of the skin had been excised and examined histologically. But it had been entirely overlooked that the patient was a human being with a human psychology. Owing to this characteristic undervaluation of the psychological viewpoint the conditions under which the disease originated remained unexplored.

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[1] At a meeting of the Section, held July 11, 1919.

The patient was a widow. She lived with her eldest son, whom she loved in spite of many mutual quarrels and difficulties. In a way he replaced her husband. Life under these conditions became more and more intolerable to the son so he decided to separate himself from his mother and seek his residence elsewhere. On the day he left her, the first fit of crying occurred. This was the beginning of a protracted illness. The course of the disease, its improvements as well as its exacerbations, all corresponded with changes in relation to the son, as could be shown clearly by means of the psychological anamnesis. The wrong diagnosis of course did not improve the symptoms; on the contrary it worked by suggestion for the worse. It was an ordinary case of hysteria, as was proved obviously by the later developments. As both of the doctors were hypnotized by belief in the physical causation and physical nature of the disease, it did not occur to them to inquire into the psychological circumstances of the case. Therefore they both could assure me that there was "nothing psychic" in the case.

Such errors, however, are easily comprehensible, if one takes into account the fact that neither alienists nor neurologists have any other training than that of natural science. But for these branches of medicine a knowledge of psychology is simply indispensable. The lack of psychological training is frequently compensated later, especially amongst general practitioners, by practical experience of life and its fundamental emotions, but unfortunately even this is not general. At all events the student hears little or nothing of abnormal psychology. Even if time should allow him to follow a course of psychology, he would only have the opportunity of learning a kind which has nothing to do with the requirements of medical practice. This at least is the situation on the Continent. As a rule psychologists are men of the laboratory and not general practitioners, at all events not experienced alienists or neurologists. Thus it is not astonishing that the psychological point of view is omitted from the anamnesis, the diagnosis and the treatment. And yet this view is of the greatest importance, not only in the realm of the neuroses, where it has been increasingly appreciated since Charcot's day, but also in the realm of mental disease.

Speaking of the psychogenesis of mental disease I have chiefly in mind those many forms lately labelled in a vague and misleading way "dementia præcox." Under this designation are gathered all those hallucinatory, katatonic, hebephrenic and paranoid conditions, not showing the characteristic organic processes of cellular destruction seen in general paralysis, senile dementia, epileptic dementia, chronic intoxications, and not belonging to the manic-depressive group. As you are aware there are certain cases belonging to the class of dementia præcox which do show cellular changes in the brain. But these changes are not regularly present nor do they explain the special symptomatology. If you compare the usual symptoms of dementia præcox with the disturbances which occur in organic brain disease you will find striking differences. There is not a single usual symptom of dementia præcox which could be called an organic symptom. There is no justification whatever for putting general paralysis, senile dementia and dementia præcox on the same level. The fact that occasional cellular destruction occurs does not justify us in classifying dementia præcox amongst organic diseases. I admit, however, that the denizens of the lunatic asylum present such a degenerative picture that one can quite understand why the term "dementia præcox" has been invented. The general aspect of a ward of the incurably insane, supports the materialistic bias of the alienist. His clientèle includes some of the worst cases possible. It is therefore natural that traits of degeneration and destruction make most impression on him. It is the same with hysteria; only the worst hysterics are confined to an asylum, therefore alienists practically see only the most hopeless and degenerated forms of the disease. Naturally such a selection must lead to a prejudiced view. If one reads the description of hysteria in a text-book on psychiatry and compares it with real hysteria as it presents itself in the consulting room of the general practitioner, you will have to acknowledge a considerable difference. The alienist sees only a minimum of hysterics and a selection of only the worst cases. But beside these there are numberless mild cases which never come near an asylum, and these are the cases of genuine hysteria. It is the same with dementia præcox. There are mild forms of this disease which very far outnumber the worst cases which alone reach the asylum. The mild forms are never confined to an asylum. They come under diagnoses as vague and mistaken as dementia præcox, such as "neurasthenia" or "psychasthenia." As a rule the general practitioner never realizes that his neurasthenic case is nothing but a mild form of that dreadful disease called dementia præcox with its almost hopeless prognosis. In the same way he would never consider his hysterical niece to be the liar and impostor and morally unreliable character of the text-books. Bad cases of hysteria give a bad repute to the whole class, hence the public does not mind confessing to nervousness, but will not confess to hysteria.

As regards the apparently destructive and degenerative traits of dementia præcox, I must call special attention to the fact that the worst katatonic states and the most complete dementias are in many cases products of the lunatic asylum, brought about by the psychological influence of the milieu, and by no means always by a destructive process independent of external conditions. It is a well known fact that the very worst demented katatonics are to be encountered in badly administered and overcrowded asylums. It is well known also that removal to noisy or otherwise unfavourable wards often has an unwholesome influence; the same applies to coercive measures or forced inactivity. All the conditions which would reduce a normal individual to psychical misery will have an equally baleful effect on the patient.

Bearing this fact in mind modern psychiatry tries as much at possible to avoid the character of a convict settlement and to give the asylum the aspect of a hospital. One makes the wards as home-like as possible, the physicians deprecate coercion, and as much personal freedom is granted to the patient as possible. Flowers at the curtained windows make a good impression not only on the normal but also on the sick. It is a fact that in these days we seldom or never see the sad pictures of demented and dirty insane persons sitting in rows along the asylum walls. And why is this so? Because we realize that these patients react to surrounding conditions just as much as the normal do. Senile dementia, general paralysis, and epileptic insanity, run their course whether they are placed side by side with similar cases or not. But cases of dementia præcox not infrequently improve or become worse in response to psychological conditions, in a way that is sometimes astonishing. Every alienist knows such cases; they prove the great importance of the psychological factor. They clearly demonstrate that dementia præcox must not be one-sidedly regarded as organic disease. Such ameliorations, or otherwise aggravations, could not occur if dementia præcox were only an organic disease.

I must also mention those frequent cases in which the beginning of the disease, or a new outbreak of it, takes place under special emotional conditions. I remember a case of my own in which a man, aged about 35 was twice seized with a katatonic attack when he came into the town in which he had lived as a student. He had a memorable love adventure there. It came to an unhappy end. He avoided returning to that town for several years, but as he had relatives there, he finally could no longer refrain from visiting them. In the course of six years he went there twice, and each time almost immediately fell ill, on account of a fatal reanimation of his memories. Both times katatonic excitement occurred. He had to be confined to an asylum. Except for those periods of confinement he was successful in his work, and apart from leading a somewhat solitary existence, did not show any noticeable traces of mental derangement.

Cases are rather common in which, whenever an engagement to marry or any similar emotional event is imminent, a renewed attack occurs. The outbreak and the development of the disease are often determined by psychological motives. I remember the case of a woman who broke down after a quarrel with another woman. The patient's temperament always had been irritable and choleric. In this particular quarrel she became violent against her partner, who in return called her "mad." This reproach roused the patient still more, and she said: "If you call me mad, you shall see what it means to be mad!" With these words she fell into a state of rage. As it caused a scandal in the street the police intervened and took her to the clinic. There she soon calmed down, only insisting somewhat too energetically upon her immediate discharge. It did not seem advisable however to allow her to return after a few hours because she was still agitated. We sent her from the consultation room to the observation ward. There she would not obey the nurses, and tried violently to open the door. She feared she would be kept permanently in the asylum. Her excitement became so troublesome that she had to be placed in another ward. As soon as she became aware of the character of the other patients there, she began to cry out we had locked her up with crazy people in order to make her mad. And again she said: "If you like to have me mad, you shall see what madness means." Immediately afterwards she fell into a katatonic dream state, with wild delusions and fits of rage, which lasted uninterruptedly for about two months.

According to my view her katatonia was nothing but pathologically exaggerated emotion, due to the fact of being confined to a lunatic asylum. During the acute stage of her illness she behaved just as the general public thinks that a mad person would behave. It was a perfect demonstration of madness in every particular. However it was certainly not hysteria, because there was a complete lack of emotional *rapport*.

It is most unlikely that there was a primary brain disturbance of an organic nature, and that the mental disorder, the violent emotions, and the subsequent delusions and hallucinations were secondary. Rather it is an instinctive reaction against deprivation of freedom. Wild animals often show similarly violent reactions when they are shut in. In spite of the manifest psychogenic causation, the case was typically katatonic, with excitement, delusions, and hallucinations, not to be distinguished from a case due to other than a psychological cause. The patient had never had such an attack before. She was always irritable, but her excitement was always due to a definite cause, and each time quickly subsided. The only really katatonic attack was the one in the asylum.

I remember another case of a similar kind. The patient was a young school teacher, who began to be lazy, dreamy and unreliable. Moreover he showed certain peculiarities in his behaviour. He was confined to an asylum for the sake of observation. At first he was quiet and accessible, and believed he would be discharged, as he was convinced of his normality. He was in a quiet ward. But when we told him that he would have to be kept under observation for some weeks at least, he became angry, and said to the doctor: "If you like to keep me here as insane, I will show you what it means to be mad." He immediately became very excited, and within a few days was completely confused, and had many delusions and hallucinations. This state lasted for some weeks.

The following case emphasizes my point: A young man had been in the asylum for almost two months. He had been certified as morally insane. This diagnosis was due to the fact that he had been proved to be a cheat and a liar. He refused to work, and was excessively lazy. It did not appear to us as if he were merely morally deficient. The possibility of dementia præcox occurred to us. There were no specific symptoms however except great moral indifference. His behaviour was disagreeably irritating, he was intriguing, and at times rough and violent. He was out of place in the quiet ward. In spite of his troublesome conduct I tried to keep him there, although many complaints were received from nurses and patients. Once, during my absence from the asylum, my substitute put him into the ward for excited patients, on account of his troublesome behaviour. There he at once became excited to such an extent that he had to be narcotized. He then began to be afraid of being murdered or poisoned and had hallucinations. Obviously the outbreak of a manifest psychosis was due to the external conditions which influenced his mental state unfavourably. It would be an unsatisfactory explanation of such a case to attribute the psychosis to sudden aggravation of pre-existing brain disease.

The exact opposite, namely marked improvement in a chronic state on account of improved external conditions, is, as is well known, rather frequent in occurrence.

If dementia præcox be essentially due to a process of organic destruction, patients should behave like those with actual changes in the brain. A patient suffering from general paralysis does not improve nor become worse as the result of a change in the psychological conditions, nor are such cases noticeably worse in bad asylums, but cases of dementia præcox are distinctly worse when the circumstances are unfavourable.

Since it is evident that the psychological factor plays a decisive rôle in the course of the dementia præcox, it is not unlikely that the first attack of the disease would be due to a psychological cause. It is a matter of common knowledge that many cases originate in a psychologically important period, or following a shock or a violent moral conflict. The alienist however is inclined to regard such conditions rather as exciting causes or auxiliary factors, which bring a latent organic disease to the surface. He thinks if such psychic experiences were really efficient causes, they should exercise a pathological effect in everybody. As this is obviously not the case, the psychic causes therefore could only have the significance of auxiliary factors. This reasoning is undoubtedly one-sided and materialistically prejudiced. Modern medicine no longer speaks of one cause and one only of a disease. Tuberculosis is no longer held to be caused only by the specific bacillus, it owes its existence to a number of competitive causes. The modern ætiological conception is no longer causalism, but *conditionalism*. Undoubtedly a psychological cause hardly ever produces insanity, unless it is supported by some specific predisposition. But on the other hand a marked predisposition may exist, where a psychosis will not arise so long as serious conflicts and emotional shocks are avoided. It can be stated however almost with certainty that psychological predisposition leads to conflict, and thus by way of a vicious circle to psychosis. Such a case looked at from an external standpoint might appear as determined by a degenerative predisposition of the brain. In my view most cases of dementia præcox are brought by their congenital predisposition into psychological conflicts; but into such as are not essentially pathological, but common in human experience. Since the predisposition consists in abnormal sensitiveness, the conflicts differ only in emotional intensity from normal conflicts. Because of their intensity they are out of all proportion with the other mental faculties of the individual. They therefore cannot be dealt with by such usual means as diversion, reason and self-control. It is only the impossibility of getting rid of an overpowering conflict that leads to insanity. Only when the individual becomes aware of the fact that he cannot help himself in his difficulties, and that nobody else will help him, is he seized by panic, which pushes him into a chaos of emotions and strange thoughts. This experience belongs to the stage of incubation, and seldom comes before the alienist, since it occurs a long time before anybody thinks of consulting a physician. But such cases are not rare in the practice of nerve specialists. When the physician succeeds in finding a solution to the conflict the patient can be saved from the psychosis.

Of course it may be objected that it is impossible to prove such a case to be the initial stage of a psychosis, and that no evidence could be brought that a psychosis would have arisen if the conflict had not been settled. Certainly I cannot supply proof of such a kind that my critics would be immediately convinced by it. If a case of indubitable dementia præcox could be brought back to normal adaptation in such a way that a definite estimate could be made of the effect of the therapeutic measures, it might be considered satisfactory evidence; but even such evidence could easily be invalidated by the objection that the apparent cure was only an accidental remission of symptoms. It is almost impossible to produce satisfactory evidence, in spite of the fact that there are not a few specialists who believe in the possible prevention of psychoses.

It is still perhaps too early to speak of a psychotherapy of psychoses. I am not altogether optimistic in this respect. For the time being I would lay stress on the importance of examining the rôle and significance of the psychological factor in the ætiology and progress of psychoses. Most of the psychoses I have explored are of an eminently complicated nature, so that I could not describe them in the narrow space of a lecture. But occasionally comparatively simple cases are met with, the origin of which can be demonstrated. I remember for instance the case of a young girl, a peasant's daughter, who suddenly fell ill with dementia præcox. Her physician, a general practitioner, told me that she was always very quiet and retiring. Her symptoms came on suddenly and unexpectedly, and nobody had suspected her of being mentally abnormal. One night she suddenly heard the voice of God speaking to her, about war and peace, and the sins of man. She had, as she said, a long talk with God. The same night Jesus also appeared to her. When I saw her, she was perfectly quiet, but absolutely without interest in her surroundings. She stood erect all day long near the stove, rocking to and fro, talking to nobody except when questioned. Her answers were short and clear, but without feeling. She greeted me without the slightest emotional reaction as if she saw me daily. Though unprepared for my coming she did not seem in the least astonished or curious to know who I was, and what the purpose of my coming was. I asked her to tell me of her experiences. In her taciturn and emotionless way she remarked she had had long talks with God. Apparently she had forgotten what the subject of her talks was. Christ looked quite like an ordinary man with blue eyes. He also talked with her, but she did not remember what He said. I told her it would be a regrettable loss if those talks should be quite forgotten.

She should have taken note of them. She said she had taken note of them, and she gave me the sheet of a calendar. But there was only a cross upon it, which she had marked on the date when she heard the voice of God for the first time. What she said was brief, somewhat evasive and indirect, and completely void of feeling. Her whole attitude was absolutely indifferent. She was intelligent, a trained teacher, but she betrayed not a trace of either intellectual or emotional reaction. We might have been speaking of her stove rather than of a most unusual phenomenon. It was impossible to get a coherent history from her. I had to draw her out bit by bit, not against any active resistance, as is the case in hysteria, but against a complete lack of interest. It was a matter of complete indifference to her whether she was questioned or not, or whether her answer was satisfactory or not. She had obviously no emotional *rapport* with her surroundings. Her indifference was such that it produced the impression that there was nothing in her that it was worth while to ask for. When I asked whether she was troubled about something in her religious experience, she calmly said that she was not. Nothing was troubling her, there were no conflicts, neither with her relatives nor with other people. I questioned her mother. She could only tell me that the evening before the onset the patient went with her sister to a religious meeting. On coming home she seemed excited, and spoke of having experienced a complete conversion at the meeting. Her doctor, deeply interested in her case, had already tried to get more out of her, because his common-sense could not believe such a disturbance could arise out of nothing. But he was confronted by her unfeigned indifference, and was forced to believe there really was nothing below the surface. Her relatives could say nothing more than that she had always been rather over quiet, retiring and shy from her sixteenth year. In childhood she was healthy, merry, and not in the least abnormal. There was no pathological heredity in the family. The ætiology was quite impenetrable.

She told me she did not actually hear any longer the voice of God, but she was almost entirely sleepless, because her thoughts were working uninterruptedly. She seemed to be quite unable to tell me what she thought about, apparently because she did not know. She made allusion to a constant movement in her head, and to the presence of electric currents in her body. But she was not sure where they came from, presumably they came from God.

There is probably no disagreement about the diagnosis of dementia præcox. Hysteria is excluded, there are no specifically hysterical symptoms, and moreover the main criterion of hysteria—viz., an emotional rapport—is absolutely lacking.

When I was seeking to arrive at the ætiology of the case the following discussion took place :—

E. : Before you heard the voice of God, did you experience a religious conversion?

Patient : Yes.

E. : If you were converted, you must have been sinful before?

Patient : Yes.

E. : How have you sinned?

Patient : I don't know.

E. : But—I do not understand—surely you must know what your sin was?

Patient : Yes, I did wrong.

E. : What did you do?

Patient : I saw a man.

E. : Where?

Patient : In the town.

E. : But do you believe it a sin to see a man?

Patient : No.

E. : Who was this man?

Patient : Mr. M.

E. : What did you feel when you saw Mr. M.?

Patient : I love him.

E. : Do you still love him?

Patient : No.

E. : Why not?

Patient : I don't know.

I will not weary you with the literal reproduction of my attempts to catch hold of the things behind the screen. They occupied about two hours. The patient was steadily taciturn and indifferent, so that I had to exert all my energy in order to continue our talk. One was under the perpetual impression of the complete hopelessness of the examination, and one almost felt the questions to be superfluous. I lay particular stress upon the patient's attitude, for it is just this attitude that makes a psychological examination so toilsome and so very often unfruitful. But it is an attitude only, and not in the least a real lack of psychic contents. It is an attitude of self-defence, a mechanism protecting against the overwhelming emotions connected with the hidden conflict.

Only the fact that the case was apparently simple gave me courage and patience to continue questioning. In more complicated cases, where it is often less a matter of realities than of phantasies, questions become more difficult and even sometimes impossible, particularly when a patient is not inclined to answer. It is quite comprehensible that physicians in an asylum have no time as a rule to occupy themselves in such a way with their cases. The exploration of a psychosis demands almost limitless time. It is not astonishing therefore that the psychogenic connexions are easily overlooked. I assure you that if the patient had been admitted to an asylum you would not find more in her anamnesis than I have already told you.

The result of my further examination was the following: Several weeks before the outbreak of the illness the patient was in town with a friend. There she became acquainted with Mr. M. When she fell in love with him she became frightened by the extraordinary intensity of her feeling. She thereupon became taciturn and shy. She did not tell her friend of her feeling or her fear. She hoped Mr. M. would return her love. Seeing no sign of this she almost immediately afterwards left the town, quite unexpectedly to her friend, and returned to her home. She felt as if she had committed a great sin on account of the intensity of her feeling, although, as she said, she had never been particularly religious before. The feeling of guilt kept on worrying her. A few weeks later her friend came to visit her. As the friend was very religious she consented to go with her to a religious meeting. There she was deeply impressed and professed conversion. She felt great relief, because the feeling of guilt disappeared, and at the same time she found her love for Mr. M. completely extinguished. I wondered why she thought her feeling of love to be sinful, and asked her why it appeared so to her. She replied that owing to her conversion she understood such a feeling for a man to be a sin against God. I called her attention to the fact that such an attitude could not be natural, whereupon she confessed that she always had felt a certain shyness of such feelings. She dated that shyness to a sin she had committed in her sixteenth year. At that time, whilst walking with a girl friend of the same age, they met an elderly idiotic woman whom they provoked to obscene behaviour. This fact became known to the girl's parents and to the school-teacher, and both punished her severely. Only afterwards she realized the wickedness of her behaviour She was much ashamed, and promised solemnly to herself to lead a pure and irreproachable life henceforth. From that time on she became retiring, not liking to go out of the house, from fear that the neighbours would know of her fault. It became her custom to stay at home and avoid all worldly amusements.

The patient had as one might suppose been a morally good child who remained, however, a child too long, a fact not rare with sensitive characters. As a consequence of her childish irresponsibility such an inadmissible deed could happen even as late as her sixteenth year. Her subsequent insight led to profound regret. The experience threw a certain shadow on the feeling of love itself, and she therefore felt disagreeably stirred, as is quite comprehensible, by everything more or less belonging to this episode. For this reason her sudden love for Mr. M. was felt like guilt. By her immediate departure she prevented the development of any further relationship and at the same time cut off all hope.

Such reactions are not essentially morbid. They are often to be observed in sensitive people in a lesser degree. In this case they were of remarkable intensity. Her tendency to transfer her hopes to the sphere of religion and to seek consolation there has nothing unusual in it. The unexpected and complete conversion is perhaps exceptional, though similar conversions, wherein there is no reason to think of a psychosis, often occur at revivals.

The pathogenic impressions are not essentially morbid, they are only particularly intense. The friend who took part in the same affair was admonished and punished like herself, yet she did not become a prey to profound regret and everlasting remorse, whereas the result of the patient's regret was that she excluded herself from intercourse with other people. This resulted in a storing up of her desire for human relations to such an extent that when she met Mr. M. she was simply overwhelmed by the intensity of her feelings. Not meeting with an immediately satisfactory response she was deeply disappointed and left precipitately. Thus she fell into still deeper trouble, and her solitary life at home became quite intolerable. Again her desire for human companionship was stored up and at this time she attended the religious meeting. The impressions made upon her turned her completely from her former hopes and expectations. She even got rid of her love. By this device she was saved indeed from her former worries, but her natural desire to share the ordinary life of a woman of her class was also abolished. Now that her hopes were turned away from the world, her "fonction du réel" created a world in herself When human beings lose hold on the concrete values of life the unconscious contents assume reality. Considered from the psychological standpoint, the psychosis is a mental condition wherein a formerly unconscious element usurps the importance of real fact. The unconscious content replaces reality.

It depends, of course, upon the original disposition whether such a conversion will lead to hysteria or to dementia præcox. If the patient can preserve his emotional *rapport* by means of dissociating himself into two personalities, the one religious and apparently transcendental, the other perhaps all too human, he will become hysterical. But if on the other hand he cuts off the emotional *rapport* with human beings entirely, so that they make no impression on him, he will become a case of dementia præcox. In the case cited there is a striking lack of emotional *rapport*, and in accordance with this fact there is no trace of hysteria.

Can one speak of an organic process in our case at all? I believe it to be completely excluded, on account of the fact that the essential experience was present in the sixteenth year, at which time there was not the slightest trace of an organic lesion. There is not the faintest evidence in favour of such an hypothesis, nor is there any reason to explain the second traumatic experience with Mr. M. as having an organic determination, or else all cases of this kind should be explained in the same way. If we have to admit cellular destruction, it certainly began after the shock of the religious conversion, in which case the organic changes would be secondary only. More than ten years ago I claimed that a great many cases of dementia præcox were in the first place psychogenic in origin,[1] the toxic or destructive processes being secondary only. But in addition I do not deny that there may be cases in which the organic processes are primary and the disturbances of the psychic functions secondary.

It is a noteworthy fact that immediately after the consultation in the foregoing case the patient's mental state improved considerably. I have repeatedly observed most striking reactions after such an examination, either in the form of a marked improvement, or on the contrary, of an exacerbation of symptoms, a fact strictly in keeping with the important rôle played by the psychic factor.

I am aware my paper does not give a full account of the problem of psychogenesis, but the point I wish to make is that in psychiatry we have a field for psychological research which is wide and not yet cultivated.

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[1] "Psychology of Dementia Præcox," New York, 1909.

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Section of Surgery.

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Closure of Cavities in Bone.[1]

By PERCY SARGENT, Lieutenant-Colonel R.A.M.C.

(ABSTRACT.)

[This paper is printed *in extenso* in the *Journal of the Royal Army Medical Corps*, February, 1919, p. 83.]

THE processes of repair in bone are not different from those occurring in other vascular tissues but are modified by the peculiar and complex structure of bone. Cancellous bone is more adapted for recovery than compact bone. The healing of cavities in bone is retarded or prevented by their walls not being collapsible. For the sound healing of any abscess cavity, the walls must be approximated until the granulations covering them are able to coalesce. In the case of the soft parts, this is effected partly by the falling together of adjacent structures, and partly by the pull of the contracting new fibrous tissue. As these processes cannot occur in the case of bone, for mechanical reasons, some operative procedure is necessary for the obliteration of cavities in bone.

Various methods of obliterating bone cavities have been applied by different surgeons. Professor A. Broca has converted the cavity into an open trough by free removal of one of its walls; the overlying soft parts being then encouraged to sink into and so gradually to obliterate the cavity. The method adopted by the author is a modification of Broca's operation, and is best described as that of "continuous muscle-grafting." Before operation the bone is examined by stereoscopic radiograms. The technique of the procedure is as follows:—

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[1] At a meeting of the Section, held December 4, 1918.

No tourniquet is employed, hæmorrhage being controlled by the frequent application of large pieces of gauze wrung out in hot saline. The bone is thoroughly exposed above and below the site of the cavity. The wall of the sinus leading down to the bone cavity is widely excised. When there is more than one sinus the one giving the most direct access to the bone is selected. The periosteum is next incised to the extent of the whole length of the wound and stripped from the bone both at the site of the cavity and for some distance above and below it. Instead of the ordinary retractors Lane's bone levers are inserted between the periosteum and bone. Before attacking the bone it is packed off by gauze pads, partly to avoid soiling the wound and partly to prevent fragments of bone getting lost among the soft parts. The stage of the operation which consists in preparing the cavity for the graft is entirely subperiosteal. The part of the wall of the cavity selected for removal should be that most conveniently related to the muscle from which the graft is to be cut. The bone cavity is now opened up, all granulation tissue and carious bone removed, and all recesses cleansed; it is then washed out with hot saline solution and plugged with gauze. This completes the first stage of the operation.

The second stage is not begun until after removal of the soiled packing and re-sterilization of the instruments. This consists in filling the cavity with a broad-pedicled muscle flap, to which an adequate blood supply must be secured. The graft may be kept in position by a few stitches of catgut. The skin is loosely sutured and small rolls of rubber are inserted in the wound to provide for the escape of exudate, one such drain being placed in the space from which the muscle graft has been cut. The drains are generally removed at the end of forty-eight hours, and the limb is splinted in such a way as to relax the parent muscle. In some cases the wound heals by first intention, but in many there is a considerable febrile reaction for a few days, with local swelling and purulent discharge from the wound, which eventually however heals soundly.

One advantage of the muscle-graft as compared with Broca's operation is that less bone need be removed, as the whole cavity need not be converted into an open gutter. Hence the bone need not be weakened to the same extent, with the risk of resulting fracture. If the cavity extends into the articular end of the bone it cannot be converted into an open trough in its whole extent. The obliteration of the cavity by the falling in, or pressing in, of the overlying soft parts may take some time or may be incomplete, but muscle-grafting fills up the space immediately and entirely. In contrast with other materials which have been used, muscle is a living vascular tissue. Union between the raw bone and raw muscle may possibly take place by first intention or the bone and muscle may each become covered with granulations which will subsequently unite. In either case the respective blood-vessels of bone and muscle coalesce.

We can but speculate as to the ultimate fate of the muscle graft: we have no evidence that bone formation occurs, and ossification in the graft would be difficult to demonstrate radiographically. The graft retains its connexion with the parent muscle, and a specimen in the Royal College of Surgeons Museum suggests that displaced muscle retains at least a recognizable muscular structure. The fate of the graft is a matter of secondary importance, for if the procedure has successfully obliterated the cavity, sound and final healing will be attained. It is immaterial from the point of view of strength whether ossification ultimately takes place or not, for as the patient uses the limb, and so subjects the bone to strains and stresses, compensatory overgrowth occurs.

DISCUSSION.

Major OSWALD SHIELDS, R.A.M.C.: Colonel Sargent, in dealing with bone cavities about to be treated with muscle-grafts, states that these cases should be carefully selected. I consider that these carefully selected cases should be those in which the cavity is comparatively small, and for preference situated in such a bone as the humerus or the tibia. In cavities in the femur, resulting from gunshot wounds, my experience with this operation has not been encouraging, nor have I seen much better results with Broca's method: these results may be due to some fault in technique or, more probably, let us hope, due to the cases being of a specially troublesome nature. The results of muscle-grafting in the above mentioned type of case have been more encouraging where the treatment has not been hurried. Such a case has been treated as one of osteomyelitis, and the wound has healed by granulations upon the application of the Carrel-Dakin solution, followed by that of red lotion, the zinc salt evidently stimulating growth. When deciding upon the adoption of a correct surgical procedure, it is wise to view it both from the anatomical and physiological standpoints, no less than the pathological. Thus I am not in favour of a large cavity in bone being filled with a muscle-graft, for the constant presence of such a graft will interfere with regeneration of bone, and the result will not be so satisfactory in regard to strength, as in the case in which the cavity is allowed to fill in with bone, in the way already mentioned. Such filling up of a cavity with bone can be seen in radiographs every day, though this is opposed to the experience of Colonel Sargent. The action of a muscle from which such a graft has been taken must necessarily be restricted and interfered with, particularly in those cases in which a large graft is taken to fill a cavity near a joint. Just as in those cases of fracture of the lower third of the femur in which the quadriceps extensor becomes firmly bound down about the seat of fracture, the free flexion of the knee-joint is interfered with. Lastly, what really does become of this muscle-graft? I cannot believe that a functionless piece of muscle will remain as vascular as before separation. I am sure that such a piece of muscle will become fibrosed and will gradually atrophy. While this is taking place, what one may describe as an internal blister is formed between the graft and the bone. This collection of fluid is apt to become infected from germs conveyed into the blood through such channels as the throat or bowel, or possibly from still infected tissues surrounding the old injury. This is the explanation of those sinuses that sometimes develop after a bone wound has apparently well healed over for months. My remarks are based not on results of exact experiment, but purely on observations in the wards of a large military hospital.

Captain Z. MENNELL: The filling up of septic cavities in bone with living muscle tissue is a war-time innovation in surgery. Soon after Colonel Sargent's return from France, I asked him to see a Corporal J., with whose condition I was not satisfied. I had, as usual, scraped out the cavity in the lower end of his femur many times and excised the sinus, but could not get the wound to heal: I had used many different antiseptics with no result, and when he suggested "muscle-graft" it was the first I had heard and seen of this operation, which has since been so useful in dealing with bone cavities. Since that time, now about a year ago, I have done I believe twenty-seven cases, but as I can only trace twenty-three I shall confine myself to this number. Colonel Sargent has finally elaborated an exacting technique for this operation, most of which is necessary for the complete success which he is now obtaining. It shortens the convalescence after what is often a very severe measure: certainly, the later results are much better than the earlier ones. I will only emphasize what I have found to be the important points of the operation in my own cases:—

(1) Complete excision of the sinus which leads to the bone cavity and of the surrounding scar tissue. It is essential, if primary union be aimed at, that the incision should be through healthy skin, and that the wound should lend itself to surface suture without the stitches being through scar tissue or under any tension. I should prefer to make an incision wide of the original scar, and content myself with local excision of the sinus in any case in which these essentials were unobtainable, or even to leave the wound open and allow the surface to granulate over.

(2) The careful packing off of the wound to avoid bone chips being over-

looked. This seems an unnecessary point to emphasize, and I only do so as I have taken out pieces from the wound in my own cases and seen several surgeons do the same in theirs.

(3) The muscle tissue used as a graft must be muscle tissue only, and without tendon or fascia attached to the surface which comes into contact with the raw bone surface. It is often useful to have intermuscular or tendinous tissue on the outer surface of the graft, as by this means the muscle can often be sutured into position with catgut. The graft must have a good blood supply, and can often be divided longitudinally turned over, and in this way lengthened to fill an awkward cavity. It must be free at one end. I believe that if left attached at both ends and allowed to fill the cavity laterally, muscular contraction will very soon pull it out.

(4) Efficient drainage of the cavity from which the muscle has been taken, through a separate wound in the most dependent position possible. It is not necessary to drain the bone cavity, and it is a mistake to drain through the original incision.

(5) Firm pressure over the muscle in the cavity when the dressing is applied. I have often seen splintage employed, but it is not always necessary.

(6) Careful examination of each case for any interference with the blood supply to the limb. In a tibia case of mine upon which Colonel Sargent operated, the femoral artery was ligatured. It is healing now, but the result is far from satisfactory. I do not think he would so treat such a case again. In another tibia case of my own, I found out afterwards that the man had been warded for four months the year before with trench feet. I certainly shall avoid such cases if possible in the future, and I look upon this man as being the only case in which I have failed to fill the cavity successfully.

With regard to after-results, as is to be expected, there is very considerable oozing, and at first I was sent for on more than one occasion because the patient was bleeding. This, however, if expected is not alarming, and only necessitates packing the wound outside the original dressing, and at most a firm bandage in addition. I do not undo the dressing for forty-eight hours or rather more; I then remove the drainage material—usually an old rubber glove, or split drainage-tube—and have on two occasions closed the opening by means of a suture, which has been left long for that purpose. There is often a considerable reaction, and sometimes, in addition to constitutional symptoms such as fever, an apparently severe local infection. This, however, only lasts a short time, and if there is efficient drainage no ill effects appear. This local reaction led me to pay much more attention to the drainage of the space from which the muscle had been removed than to that of the bone cavity with the muscle *in situ*, and also to the position of the drainage incision. I believe, as in other cases, the position of the patient or of the limb will do much to assist this drainage. In two or three cases I have had the wound irrigated with saline through the drainage incision. There has been an erysipelas-like appearance in two of my own cases and in two other cases known to me; this does not seem to retard recovery or the ultimate result, but is somewhat alarming at the time, being accompanied by severe constitutional disturbance. The operation, from its description and when first seen, seems to be an unnecessarily severe one, but everyone who has dealt with these cases by other means must be disappointed. I have given anæsthetics and seen several operations in cases in which the full technique has not been carried out. I have heard the most scathing remarks as to the results made both by the surgeons who did the operation on its merits, and by the sisters who had to look after the patients. This was not the case, however, when the operation was carried out on the lines suggested by Colonel Sargent. Recently there have been cases in which there has hardly been a rise of temperature. In one humerus case I split the triceps, and curled the cut end up into the large cavity, which it filled accurately. The boy was up three days after the operation: the wound healed like a clean one, and has continued in good condition since.

Compound Fractures of the Femur in its Upper Third, with Demonstration of New Pelvic-Femur Splint, also a Splint for Fractures of the Upper Extremity.

By John Robert Lee, F.R.C.S., Major R.A.M.C.

(Officer in Charge, Surgical Division, Fulham Military Hospital, Hammersmith.)

At Fulham Military Hospital, London, we have had many opportunities of treating fractured femurs and also of seeing the results of treatment in other hospitals, as shown by cases which have been transferred to us. The number of cases which come to amputation from sepsis, or which join up in bad position with stiff joints, is very great. For instance, during last June we had twenty fractured femurs sent over to us from France, where they had been in special hospitals from one to five months; of these some were in fairly good position and not very septic, several of them were more or less united in bad position, and most of them had sequestra, due to trauma and inefficient drainage.

It is of the fractures of the femur in its upper third I wish especially to speak. Ten of the twenty femur cases admitted in June were

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[1] At a meeting of the Section, held December 4, 1918.

those of fractures in the upper third—of these three were in good position and only slightly septic; two were in fairly good position but septic; five were in bad position, and of these three were very septic. Therefore 50 per cent. were in bad position and 50 per cent. were very septic. These results should be capable of improvement.

The position or displacement of the fragments in fractures of the upper third as a rule is as follows:—

(1) The upper fragment is abducted and flexed by the glutei and ilio-psoas muscles.

(2) The lower fragment is displaced backwards, upwards, and inwards by the hamstrings, quadriceps and adductor muscles. The powerful adductor magnus being an exceedingly important factor, there is also some rotation. This deformity is typical; the main causes producing it are:—

(*a*) The direction of the fracturing force.

(*b*) The action of the muscle groups.

The essentials of correct treatment rest on an adequate consideration of the anatomical factors and the principles of surgery, the latter including arrest of hæmorrhage, establishment of efficient drainage, provision for antisepsis, general care of the patient, massage, &c. I want, however, to draw special attention to the anatomical factors. The fragments should be brought into correct alignment, the muscle groups placed in a condition of physiological rest, and the limb securely fixed in order that there may be no movement of the fragments or spasm of muscles; at the same time any interference with the circulation of the limb should be avoided. Hitherto it has been taught that in fractures of the upper third "the upper fragment, being short, cannot be controlled." Therefore attempts have been made to procure alignment by abducting the lower fragment. *This method is wrong in principle.* I have taken measurements of a great many men and find that the distance between the symphysis pubis and the adductor tubercle is on an average two inches greater in the abducted position than when the knees are side by side—hence in the abducted position of the limb the adductor group of muscles have a greatly increased pull, are in a condition of spasm instead of physiological rest and, therefore, although the two fragments are brought parallel to one another, an X-ray examination in many cases reveals the fact that the upper end of the lower fragment has now moved upwards a distance of about 2 in., and takes up a position near the lesser trochanter; an amount of extension that can be applied with safety fails to correct the shortening. Unless the two ends of the bone were impacted, what has been accomplished is increased overlapping of the fragments, and not an elongation of the adductor muscles. It occurred to me that if the upper fragment could be controlled and the abduction overcome, the fragments could be brought into proper alignment with the limb and the muscles in a nearly normal position. With these principles in view I designed a new appliance which I have called a pelvic-femur splint. It consists of a grip with two pads which fit the pelvis; modified Thomas's frames for both lower extremities are hinged on to the pelvic grip. The pelvic grip can be adjusted to fit any pelvis comfortably and securely. The pelvis and upper part of the femur on each side are grasped by the pelvic pads. The abducted upper fragment can be controlled and adducted to its normal position quite easily. The amount of pressure required is regulated and the fragment kept in position by a fly nut working on a screw. Both limbs can be put up in the iron frames in the ordinary way. The upper fragment having been brought into proper position the lower one can be placed in correct alignment by abducting or adducting, raising or lowering as required while on the splint, the latter working on hinges or joints. Any backward displacement can be corrected by manipulating the small wooden splint by means of screws. Adequate extension can be applied. If much extension is found to be necessary an adjustable piece similar to that used in the arm splint can be fitted from the pelvic pad to the axilla on each side; hence the upward thrust of the extending force will be partly taken by the axillæ and trunk and the pelvic calliper grip not displaced. All these manipulations should be done on an X-ray couch (if necessary under an anæsthetic), so as to *see* that the two ends of the bone are in actual alignment, not merely supposed to be so. Having completed all manipulations necessary, the binding screws are firmly adjusted. The pelvis and lower limbs can be suspended by means of pulleys on a frame—the patient's body raised as needed for convenience of nursing, the prevention of bedsores, &c. Many patients complain that splints fitted with a ring around the thigh, as in a Thomas's splint, cause much discomfort. With this splint there are no bands encircling the limb, hence no interference with the circulation occurs, which is a very important factor, especially in septic cases.

The splint can be easily applied with a minimum of movement. When it is applied the fragments of the bone are securely held in proper anatomical position, the muscles are at rest, all necessary dressings, nursing, &c., can be carried out, and if any movement of the patient is necessary he is moved as a whole and not in parts.

The iron leg portion of the splint can be raised at right angles to the operating table and thus be out of the way should any operative procedure be necessary—the upper fragment being perfectly controlled by the grip pad, the lower steadied by an assistant.

The splint is made double to ensure steadiness and to enable the patient to be moved easily. The final result is that the patient lies with the fractured thigh in its proper position comfortably beside the healthy limb. In all cases skiagrams are necessary—both antero-posterior and lateral, in order to show whether the fragments are actually in correct position.

While the splint is useful in all fractures below the great trochanter where there is abduction of the upper fragment, its use is not limited to compound fractures of the femur but it would be of great value in treating fractured pelvis, intracapsular fractures, and anterior poliomyelitis to give rest to paralysed muscles.

Arm Splint.—An efficient splint for the upper extremity should be firmly fixed to the patient's body so as to carry the limb, keep the fracture in proper position and at rest.

Usually the splint hangs on the limb instead of supporting it. The splint for the upper extremity, which has been designed by me, consists of two parts. One fits firmly on to the trunk. The other carries the limb. The upright trunk part is fitted to the hip with an adjustable piece which allows its upper forked end to be securely fitted into the axilla. This part is fastened round the body by two straps. To the upper end of the fork the part which carries the limb is attached by joints which allow the arm to be adducted to any desired angle and retained there; the centre of movement passes through the head of the humerus. By releasing a set screw on the tubular piece the hip portion can be turned round; the limb attachment is then turned completely over, hence the splint can be used for right or left limb equally effectively. The splint can be adjusted so as to support the shoulder in any desired position. The forearm can be placed in either the semi-prone or supine position. Provision is made for any necessary extension. When properly fitted the patient carries his upper extremity with the whole weight supported by his body—hence the limb is kept quite steady and at rest. Dressing of wounds, massage, &c., can be carried out without interfering with the splint.

After much careful observation of many cases, I have designed these two splints—one for each extremity, and have proved that both appliances are efficient, easy to apply, and give great comfort to the patient. I have taken this opportunity of demonstrating them in the hope that their use in treatment of such cases may help to produce better results in the future.

In conclusion, I desire to express my warmest thanks to my colleagues, especially to Lieutenant-Colonel C. T. Parsons, for valuable help and encouragement, to Dr. Florence Stoney for her great assistance with the X-rays, to the staff of the Kensington War Hospital Supply Depot, and to Messrs. Arnold and Sons who made the splints for me.

Section of Surgery.

President—Sir JOHN BLAND-SUTTON, F.R.C.S.

Mandibular Bone-grafts.[1]

By C. W. WALDRON, Major C.A.M.C., and E. F. RISDON, Captain C.A.M.C.

BONE transplantation in so far as the lower jaw is concerned is a surgical procedure of long standing, yet when one looks back upon the relative infrequency of this operation in civil practice, one realizes the unexampled opportunities afforded us by the large number of cases of war injuries of the mandible. During the past three years the surgeons doing this work have made a careful and uninterrupted study of all the various phases of the problems arising in cases of severe fractures of the lower jaw. Within a few days of being wounded most of these cases have come to a special jaw injury centre for treatment. We are all aware of the excellent results obtained by this policy of segregation, for the large percentage of cases attaining bony union and good function testify to the skilful splint treatment rendered by the dental surgeons specializing in this work. In those cases in which X-ray and clinical examinations would seem to show such an extensive bony loss that union could not reasonably be expected, we are strongly of the opinion that continued surgical supervision and close co-operation with the dental surgeon are of prime importance.

EARLY TREATMENT.

Though not strictly within the scope of this paper, we feel that some of the more important points should be considered. In the early stages persistent efforts should be made to keep the mouth as clean as possible by frequent mouth-washes and irrigation of pockets and sinuses. We are convinced that too much stress cannot be laid upon the evil effects of curetting the fragments. Our policy has been to encourage free drainage of the sinuses present without disturbing the comminuted fragments, removing sequestra from time to time as they are found to be separated. The increasing number of very severely comminuted fractures resulting in bony union confirms our belief in the merits of such conservative treatment. Displacements of the fragments should be corrected by dental splints as early as possible and when there is a remote possibility of union taking place, it is advisable to secure additional immobilization by the construction of a dental splint for the upper jaw, to which the splinted lower jaw, in correct occlusion, may be fixed, by means of an interlocking device. The prevention of displacement and the control of edentulous posterior fragments are of great importance in the early stages and in many cases may be most difficult. The usual methods employed are posterior extensions from the lower or the upper splints. Other methods, of which we have had no experience, are the malar-coronoid screw fixation, described by Major H. P. Pickerill, N.Z.M.C., and that of Bruhn and Lindemann, who, by an external operation, expose the posterior fragment, to which a wire is fixed by means of washers and a nut. This wire is attached to the mandibular splint by means of a bar extension. It is usually not advisable to keep the mouth closed by splints for more than two months, for after that time the careful exercise of function seems to promote increased bone formation in those cases in which some degree of union may take place. Where non-union is obvious, the early use of the jaws is advantageous in that atrophy and extra-articular ankylosis are prevented. In many cases this is accomplished by the insertion of a small splint on one fragment with a flange extension which maintains correct occlusion yet allows free opening of the jaws. A careful examination of the teeth should be made, extracting such as are sources of infection, and those that are too close to the lines of fracture, and preserving those that will be of service in the immobilization of the parts when the bone-graft is performed. The latter point is of great importance, and every care should be taken in the early treatment to prevent undue strain upon the essential teeth. Careful examination should be made at regular intervals, to ensure efficient drainage as long as external or alveolar sinuses are existent, and, to determine as accurately as possible, and record the date at which the external and alveolar sinuses have finally become healed.

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[1] At a meeting of the Section, held January 22, 1919.

WHEN TO OPERATE.

Clinical and bacteriological evidence has shown that operations should not be performed until at least six months have elapsed after the complete disappearance of all inflammatory phenomena. Further delay is of benefit in those cases in which the ununited fragments are strong, easily controlled, and fair powers of mastication may be obtained by means of dentures or splints. In the case of edentulous or short posterior fragments that are controlled with difficulty, bone-grafting should be performed at the end of six months, in order to prevent atrophy, displacement or fixation of the free fragment. Without doubt some of the failures reported in the literature, may be attributed to operating at too early a date.

THE TRANSPLANTATION OF BONE.

The consensus of opinion appears to be that the transplanted bone has varying, but extremely important, osteogenetic properties. Gallie and Robertson [2] have shown that this is due to the osteoblasts present on the periosteal and endosteal surfaces and in the open mouths of the Haversian canals, which are in a position to absorb nutriment from the bathing lymph. As osteoblasts are most numerous on the endosteal surface, they recommend that grafts should include periosteal and endosteal surfaces. Albee [1], for the same reason, advises a bone-graft consisting of all its elements as it approaches more closely a complete physiological unit—especially in reference to nutritional distribution—which is obviously an advantage. With regard to the osteo-conductive property of transplanted bone, Gallie and Robertson state that the rapidity of absorption and replacement of the graft depends on its size, density and the abundance of the supply of osteoblasts that survive on the surface, the replacement being slower in very thick grafts. With regard to the density of the graft, their experience is that replacement is very rapid in open cancellous bone, such as the rib, less rapid in grafts cut from the face of the tibia, and most retarded in densely compact bone, such as the crest of the tibia. The relative osteogenetic activity of the transplanted bone and of the fragments must vary with the individual case, and therefore the principles outlined should be applied surgically in such a way that full advantage is taken of the osteogenetic properties of the fragments and transplanted bone, and of the osteo-conductive properties of the latter. This will be discussed when describing technique of the operation.

We have not had any experience with osteo-periosteal grafts but have seen many excellent results in the hands of our colleagues at the Queen's Hospital, Sidcup. This method is best suited to cases where the bony loss is slight, or where there is incomplete union. Neither have we used the pedicled graft which Mr. Percival Cole so strongly recommends, but we intend to use it before long. It might, with advantage, be combined with free iliac crest or tibial grafts or with osteo-periosteal grafts.

We have not had any experience in the use of boiled bone, having confined our work to the use of autogenous free grafts.

TYPES OF FRACTURES AND SPLINTS.

These may be conveniently classified according to the relative difficulty in immobilizing one or both of the fragments. This is shown diagrammatically in figs. 1, 2, and 3 (pp. 19, 20), showing the fracture and the general plan of immobilization by dental splints.

Even when specially constructed, dental splints are only capable of very limited modification at, or during the time of, operation. It is preferable, therefore, in most cases to fix the fragments in good position by means of strong dental splints not capable of adjustment, and to carry out the operative technique accordingly.

We have not used the open-bite splint, but expect to do so in the near future, in some cases with edentulous fragments.

The results obtained on this service are in a large measure due to the excellent services rendered by our dental colleagues, Captain B. Mendleson, attached R.A.M.C., and Captain A. H. L. Campbell, C.A.D.C.

THE OPERATION.

Fixation of the Fragments.—The necessary dental splints should be cemented to the teeth at least one week before the operation, in order that the mucous membrane of the buccal cavity may become accustomed to them. We have found that frequently small ulcers occur, owing to small irregularities in the splints, the projection of the interlocking devices and the action of the free acid from the cement.

The Anæsthetic.—Rectal oil ether anæsthesia, supplemented when necessary by intrapharyngeal ether administered through a nasal tube, has been the method employed in eighteen of our cases. We have adopted this method as a routine in bone-grafting, as one most satisfactory in every way.

The Preparation of the Operative Field.—After a preliminary ether and tincture of iodine preparation of the skin, we fix a square piece of sterile dental rubber dam to the cheek and the lower lip, by means of adhesive plaster. By turning this upwards, the mouth is walled off from the overlying towels, which will be subsequently placed, and soiling or contamination of them by mucus or saliva is prevented. At the conclusion of the operation, the rubber dam is turned down, covering and protecting the dressing from the fluids of the mouth. The incision is made in accordance with the position of the bony defect, keeping in mind the desirability of having the closure below the level of the graft rather than directly over it. The non-touch technique introduced by Sir Arbuthnot Lane is followed. As soon as the subcutaneous tissues are freely exposed, the skin surface is walled off from the wound. The ends of the fragments are exposed and the periosteum is elevated from their external, inferior and internal surfaces for a distance of 1·5 to 2 cm. on each side of the hiatus. Great care must be taken, particularly on the internal surface, to avoid perforation into the mouth cavity. The height to which the separation may be carried safely may be determined by the previous examination of the mucous membrane over the ends of the fragments and reference to the X-ray plates.

Preparation of the Fragments.—The ends of the fragments should be trimmed back from 1 to 1·5 cm. or more, until bleeding, healthy bone is reached. Intervening cicatricial tissue should be excised and discarded. After some experience with electric bone-grafting instruments, circular saws, &c., used in attempting to shape the fragments and graft by the formation of steps, pegs, and dovetailing, &c., with a view to obtaining auto-fixation of the graft, we have discarded these more complicated methods and instruments, in favour of the most simple. Since taking this step, our results have been better. We do not like the peg and hole fixation on account of the fact that the preparation of the hole in the fragments involves the reaming out of the endosteal tissues, which are of greatest osteogenetic importance. Accurate dovetailing and the formation of steps in the fragments of the lower jaw are quite difficult on account of the general contour and variations in the planes of the fragments. When one realizes that but little more than 1 cm. of the external surface of the jaw in a vertical direction may be exposed with safety, the difficulties in the manipulation of electrically driven saws in so small a space are readily appreciated. These methods usually involve the use of the tibia, and we have observed that in order to secure a good mechanical fit the endosteal surfaces of the grafts have been sacrificed. We therefore prepare the fragments by the use of rongeur forceps, our choice being a Friesner mastoid rongeur forceps and Lane's gouge forceps. We attempt to square off the ends as well as possible, and to leave a ledge above the graft which affords additional surface contact between the fragments and the graft. This is shown in fig. 1*a* (p. 19). This method puts a minimum of operative stress upon the interdental splints, precluding any possibility of displacing the fragments from the splints. In the case of gaps, situated anteriorly, a square or butt joint may not be readily obtained on account of the contour and planes of the two fragments. A satisfactory overlapping plane joint, can, however, usually be obtained without much difficulty. Similarly some special preparation with overlapping or notching may be found necessary in the case of free posterior fragments, which may, with advantage, be forced backwards and slightly downwards by the graft. When the bed for the graft is prepared, holes are drilled in the fragments through which two short lengths of Belgian iron wire are passed and held by clamps. Measurements are then taken for the graft.

THE GRAFT.

In choosing bone for grafting purposes, we have been guided by the theory that the larger the area covered by osteoblasts in the Haversian canals into which the blood-vessels may project, the better, and the more cancellous the graft is, consistent with necessary strength, the more rapid will be the change from the transformed section of the transplant to the live bone forming bony union. We feel that the bone that fulfils the above requirements best is the iliac crest. The tibial crest, in our experience, has given good results, also the inner surface of the same bone, but according to the theory, the grafting is rather too compact when the tibial crest is used. Further, the patients may be incapacitated for some time, and fractures of the leg at a later date are by no means rare. The rib, in our cases, was not a success, as it seemed to undergo an aseptic absorption, which resulted in a springy mandible, where the graft was long. In these cases, a considerable portion of the outer compact surfaces had been removed before inserting, to allow the fluids of its bed to permeate it. This has also been the reported experience of some German surgeons, and further, in many cases of other surgeons we have examined, where the rib was used, we have noted the same objection. The iliac crest graft is easily obtained, is very cancellous, strong, and particularly adaptable, as any surface may be used. The crest is easily exposed and the required amount removed by thin chisels and narrow saws. Hæmorrhage may be free, necessitating firm pressure and the insertion of a rubber-tube drainage. The graft is readily trimmed and fitted to place. Holes are then drilled in each end of the transplant, through which are threaded the wires previously inserted in the ends of the fragments. These are then tightened, fixing the graft firmly in position. The subcutaneous tissues are then united with interrupted mattress catgut sutures, and the skin closed with horsehair. It is important that all hæmorrhage should be controlled before closure. Should any slight oozing persist a short drainage tube to the subcutaneous tissues may be left in position for twenty-four hours. The technique we have employed for incomplete alveolar union is similar, as shown in fig. 4*a*. For incomplete basilar union, we have used the tibial inlay graft, as in fig. 5*a* (p. 21).

POST-OPERATIVE COURSE—TREATMENT—COMPLICATIONS.

The patients are kept on a fluid diet for a few days, after which ordinary minced diet may be ordered. It is advisable to keep the iliac crest cases in bed for a period of ten days or two weeks, in order to avoid the formation of hæmatomata which may become infected. In several of our cases slight infection occurred, which, under treatment, healed nicely without any ill effects. The facial incisions healed *per primam* in fifteen out of our twenty-three bone-grafts of the lower jaw. In two, slight suppuration necessitated the removal of the wires, and the grafts were removed in four cases. The splints are left in position keeping the mouth closed for two months. If both fragments are well controlled by the lower splint, the mouth may then be left open and function exercised carefully. If the posterior fragment is free, it seems advisable to keep the mouth closed for three or four months. During this period the splint-pins may be removed at intervals, and the mouth opened for examination. We have been removing the splints about four months after operation. In some of our cases splints have been left on for a much longer period on account of the fact that the patients were away on extended furlough. The time of removal of the splints is more or less governed by the progress shown in the X-ray.

RÉSUMÉ OF CASES SHOWN.

Ten patients were shown. Two had some degree of alveolar union, with slight but definite movement at the site of fracture after a year or more of observation, and the operations were performed with the view of obtaining strong union. In one of them infection occurred, necessitating the removal of the tibial graft. A large amount of new bone was, however, laid down, resulting in strong bony union. The second was an iliac crest graft, in which strong bony union was obtained. In the remaining eight patients (nine grafts), separation of the fragments, varying from 0·5 cm. to 6 c.m., was found at operation. Both fragments were well immobilized by the splints in three cases, and strong bony union, with good function, was obtained (one tibial and two iliac crest grafts). In one case the posterior fragment was displaced from the splint at the time of operation. An iliac crest graft with hole and peg fixation at one end was used. Union has progressed very slowly, but is finally becoming bony. The functional result is good. In one patient, immobilization was most difficult and imperfect on account of the few remaining teeth being weak and the absence of upper teeth. The connective tissue bed for the graft was thin, containing considerable scar tissue. A bent, split, rib-graft was used. Following the operation there was a recurrence of a salivary fistula, accompanied by slight suppuration, necessitating removal of one of the wires. The parts are now well healed and the graft is in position. The result is in doubt. The posterior fragments were not controlled in three cases (four grafts). In one (iliac crest), the functional result is good, but strong manipulation reveals a definite spring between the graft and the anterior fragment. In the remaining two cases (one double-graft tibial and one iliac crest), union progressed very slowly, but finally complete bony consolidation took place.

CONCLUSIONS.

(1) Bone-grafting of the lower jaw is an operative procedure, whereby union of the fracture and restoration of function may be expected in a large percentage of cases.

(2) Complete co-operation and careful attention to every detail by the dental surgeon and the surgeon concerned are essential from the "early treatment," to the "final" stage.

(3) Full advantage should be taken of the osteogenetic activity of the fragments, and of the transplanted bone, and also of the osteo-

conductive properties of the latter. The iliac crest is, in our experience, best suited in most cases for the bridging of defects in the lower jaw.

(4) The operation should be made as simple as possible, the object being to obtain good contact of the graft to fresh, healthy bone of the fragments, maintaining the same firmly in position by wiring.

REFERENCES.

[1] **Albee, F. H.** "Bone Graft Surgery," Philad. and Lond., 1915.

[2] **Gallie, W. E.**, and **Robertson, D. E.** "Transplantation of Bone," *Journ. Amer. Med. Assoc.*, 1918, lxx, p. 1134.

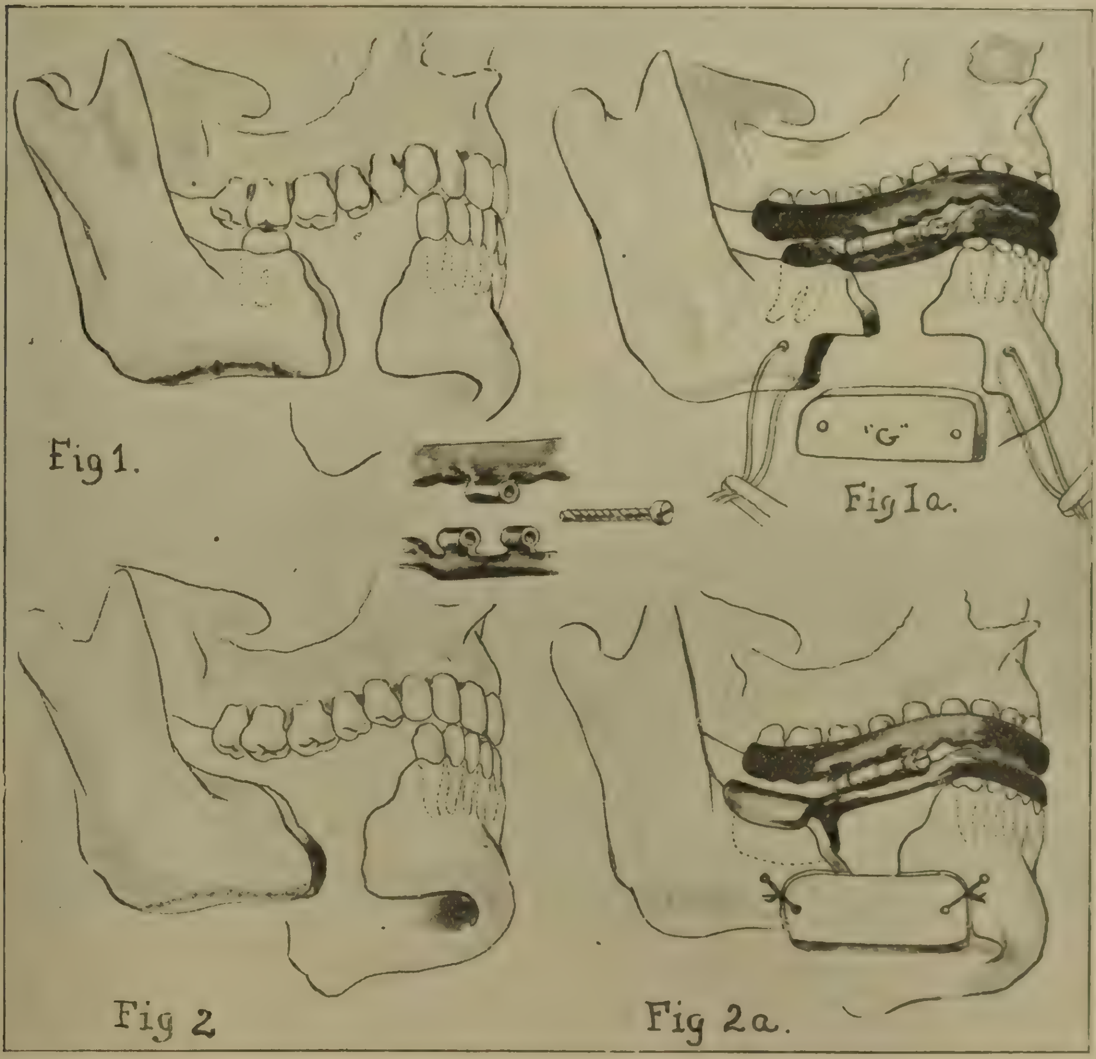

Fig. 1.—Non-union right premolar region.

Fig. 1*a*.—Fixation of fragments by dental splints. Preparation of fragments for graft "G."

Fig. 2.—Edentulous posterior fragment.

Fig. 2*a*.—Control of edentulous posterior fragment by dental splints. Fixation of graft.

Inset.—Interlocking device.

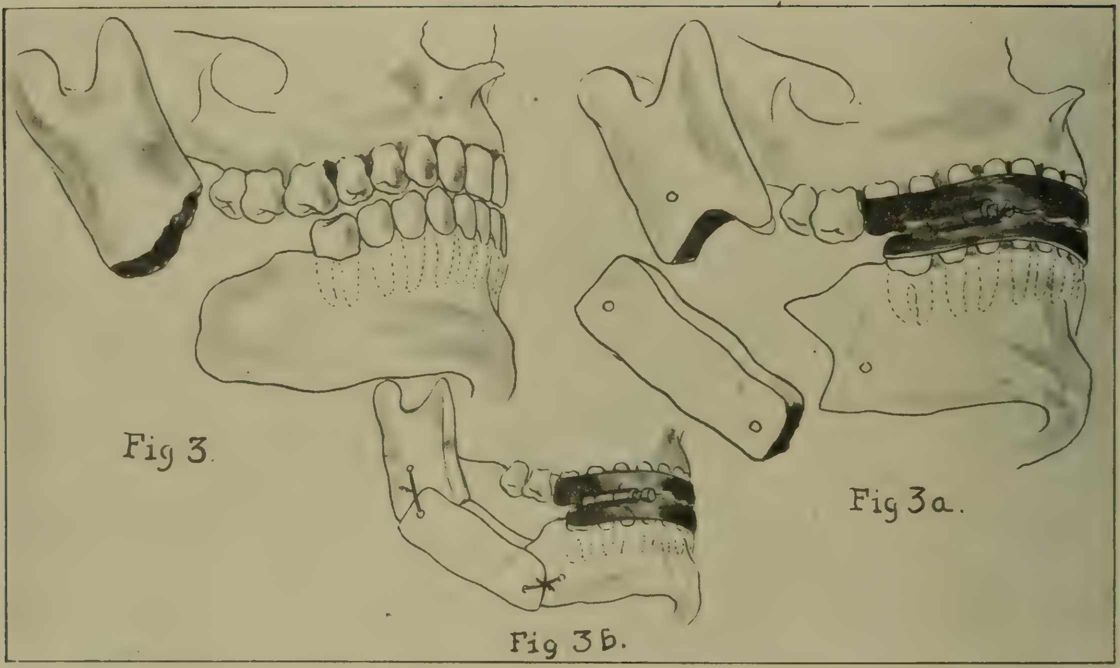

Fig. 3.—Non-union region of angle—control of posterior fragment most difficult.

Fig. 3*a*.—Splint fixation of anterior fragment. Preparation of fragments for graft.

Fig. 3*b*.—Posterior fragment wedged backward by graft.

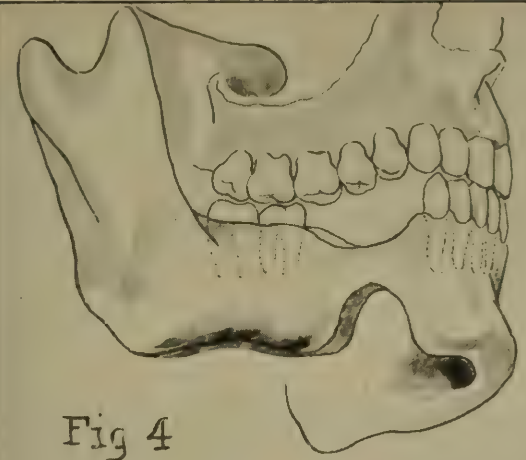
Fig 4

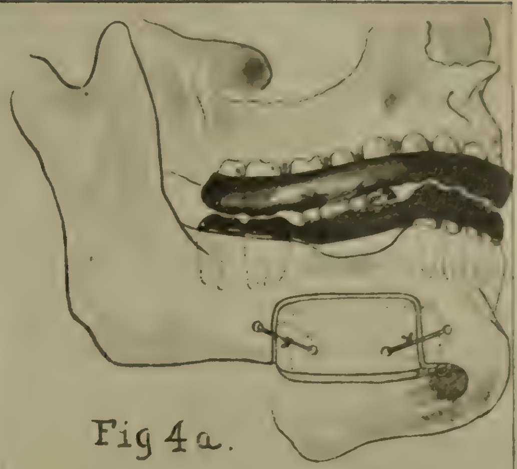
Fig 4a.

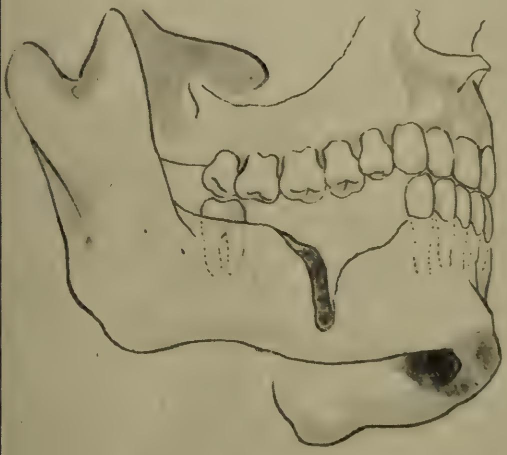
Fig 5

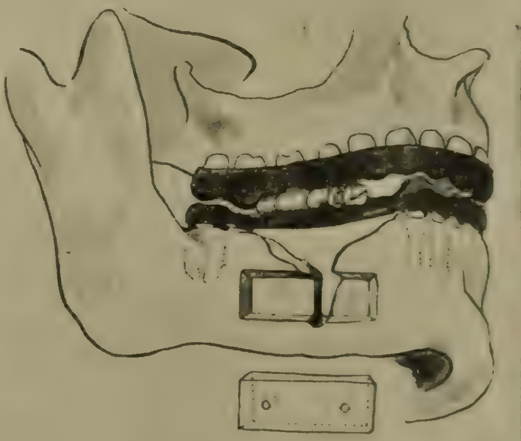
Fig 5a.

Fig. 4.—Incomplete union, alveolar; basilar defect.

Fig. 4*a*.—Splint treatment and fixation of bone-graft.

Fig. 5.—Incomplete union, basilar.

Fig. 5*a*.—Preparation for inlay bone-graft.

DISCUSSION ON BONE-GRAFTING.

Captain W. E. GALLIE, C.A.M.C.

(ABSTRACT.)[1]

SOME of the old beliefs on this subject have been shaken as a result of experience with war injuries. Many experiments on dogs have been carried out in the clinic to which I am attached. When a piece of living bone has been separated from its vascular supply and implanted elsewhere in the body of the same patient the immediate result is a coagulation of cells and vessels to which the surrounding lymph cannot percolate. This leads to the death of all the cells in the lacunæ and of most of those in the Haversian canals. The absorption of these structures takes from three to four weeks. On the open mouths of the canals are osteoblasts, which possess the power of absorbing lymph. Ten days after implantation the proliferation of the osteoblasts is well established on both the endosteal and periosteal surfaces, and in a few days new bone formation is visible on these surfaces. These proliferating osteoblasts attack the dead bone of the graft and rapidly produce excavations. In the meantime a re-establishment of the circulation has been taking place as a result of the ingrowth of new blood-vessels into the mouths of the Haversian canals. This occurs in about a fortnight. Ultimately the whole graft is seen to be permeated by vessels and osteoblasts. The union of the graft is effected by the deposit of new bone on the surface. If endosteal and periosteal surfaces are removed from the graft, very little osteogenesis takes place from the graft itself. The rapidity with which the changes take place depends on three factors: the size of the graft, its density, and the abundance, on the surface, of the osteoblasts which survive. In some cases it will be months before replacement may be effected. When boiled bone is employed for grafts the changes take place at a definitely slower rate. Autogenous grafts alone guarantee success where there is a gap to be bridged; if boiled bone be used here the living elements will slowly disappear. The great aim in grafting, as it is only on the surface that living osteoblasts survive, is to have the largest osteoblast-bearing surface possible, therefore the width of the graft should be greater than its thickness. Tibial bone should only be employed in cases where a strong graft is essential; graft from the rib is better, as it is both more porous and better supplied with lymph. It is advisable to split the graft into several portions; in this way a large number of osteoblasts will be afforded the chance of survival. Instead of Arbuthnot Lane's metallic plate boiled bone-graft plates have been used at the clinic to which I am attached, and these have proved very satisfactory. There is no likelihood of these becoming loose, and after the lapse of ten months the only evidence of irregularity is a slight fusiform swelling. Even this disappears after a still further interval of time.

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[1] The record of the work upon which this communication is based is published *in extenso* in the *Journal of the American Medical Association*, 1918, lxx, pp. 1134-40, and the *American Journal of Orthopædic Surgery*, 1918, xvi, pp. 373-83.

Major NAUGHTON DUNN, R.A.M.C. (Birmingham).

I PROPOSE to deal only with the function of the bone-graft from the clinical side, the selection of cases, the points in operative technique and the after-treatment, which seem from my experience to be the most essential for success.

Previous to the War, Albee's operation of transplantation of bone from the tibia to fix the spinous processes of diseased vertebræ was becoming popular. After seeing the results of over fifty cases I am satisfied that this will in time be recognized as the routine treatment of tubercle of the spine in children and adults. The operation, if undertaken before marked kyphosis is present, will result in a very large percentage of cures without deformity. The essential of the operation is insuring contact of the graft to the raw surfaces of the spinous processes of the two vertebræ above and of the two below the diseased bodies, so that the transplanted bone may, by direct union with these, give us a fixation which is not possible by external splintage.

In military surgery ununited fracture of the long bones is not uncommon, and the chief value of the bone-graft has been, that it has enabled us to restore continuity even when a considerable loss of substance was present. Before resorting to bone-grafting two questions arise: (i) Will re-establishment of continuity improve function? and (ii) is the use of the bone-graft the best means? In the lower extremity bone-grafting is seldom necessary, except for ununited fractures of the tibia. For ununited fractures of the femur open operation to freshen the ends and reduce the fracture has, with efficient external fixation, given excellent results. Non-union of the fibula has not in my experience given rise to much disability; cases in which the middle two-thirds of the bone have been deliberately removed seeming as regards function to have perfectly normal limbs. In the bones of the upper extremity non-union is more common, but the cases requiring the use of the bone-graft call for careful selection.

The Humerus.—Moderate shortening in the case of the upper extremity is no serious disability, so that direct apposition of the fragments with a bone-graft, to ensure adequate fixation, will be used where possible. Where either the upper or the lower fragment is too short to allow adequate fixation of a graft, direct implantation of one fragment into the other will usually be preferred. The result will then depend largely on the efficiency of the external fixation applied. Where a flail limb results in entire loss of the upper portion, direct fixation of the shaft to the scapula will, as a rule, give better functional result than the use of a graft.

Forearm.—Non-union of one of the bones of the forearm has been remarkably frequent, and I have had three cases in which a flail limb has resulted from non-union of both. In dealing with ununited fractures of the forearm bones, we must remember that where ankylosis of the superior or inferior radio-ulnar joints is present, any movement of pronation and supination taking place at the site of the fracture will be lost if union of the fragments is re-established.

Radius.—The hand articulates mainly with the radius, so that loss of continuity of this bone is associated with radial deviation of the hand and considerable weakness of grasp. This is especially so in ununited fractures of the distal portion of the bone. A general rule is that all cases of ununited fracture of the lower two-thirds of the radius require bone-grafting to give stability to the hand. In cases of ununited fracture of the upper third this may not be necessary, and if associated with ankylosis of the superior radio-ulnar joint should not be undertaken, as reunion of the fragments will result in loss of the movements of pronation and supination. Where the lower fragment of the radius is less than 1 in. in length, shortening of the ulna to correct the radial deviation and allow direct union of the radius gives the best results.

Ulna.—In the case of non-union of the ulna, weakness of the hand is less marked, and there is little deformity. Ununited fracture of the lower third of the ulna or of the olecranon may as a rule be ignored.

Where the inferior radio-ulnar joint is ankylosed, loss of pronation and supination will result from reunion of the fragments. Before operation in these cases mobility of the hand should be restored, the radial deviation of the hand corrected and the forearm fixed for a time in the supine position. Unless this is first secured there will be strain on the graft after operation or union will occur in the position of deformity, which will necessitate further operation for the best result.

THE OPERATION OF BONE-GRAFTING.

Success in bone-grafting depends on (1) asepsis; (2) adequate contact of raw surfaces; and (3) efficient fixation.

If there has been severe sepsis, all wounds should be healed for six months and scar tissue excised where possible, as a preliminary to the major operation. The preliminary excision of scar tissue serves three useful purposes: (i) It enables us to judge of the probability of grafting bone without recrudescence of sepsis; (ii) it removes tissue of low vitality, which would itself tend to slough after its blood supply is further reduced; (iii) its removal allows healthy vascular tissue to surround the bone-graft.

The graft should consist of periosteum, cortex and endosteum, and be of sufficient strength itself to withstand the strain of function when its union to the fragments is complete. Care should be taken that the bed for the graft is cut on surfaces which will be in continuity when the limb is in the desired position. In the case of the forearm this will usually be supination, so that we should arrange for this position to be maintained from the time the incision is made until the fixation splints have been applied. The joints above and below the fracture should be controlled, and no movement which might disturb the position of the graft allowed. Movements of the digits should be encouraged.

The source of the graft will usually be the inner surface of the tibia or the fibula—either of these gives us a graft of adequate length and strength—and, in order to ensure adequate contact of raw surfaces, it should be as long as anatomical conditions in the receiving bone allow. It should be just a little wider than the bed which has been cut for it, so that when prised into place it is gripped firmly by the lips of the fragments and further fixation is not necessary. Failing this, kangaroo tendon suture will ensure adequate fixation. The graft should be firmly held in its bed by bone forceps while these are tied. The wound is closed by deep and superficial sutures, and two tubes, a quarter of an inch in diameter, inserted for drainage. These are removed at the end of forty-eight hours. This is a detail of some importance, as loss of vitality of the graft has seemed to result from the presence of a hæmatoma between the graft and the surrounding structures on which it is dependent for its blood supply. The limb is then encased in plaster of Paris, fixing the joints above and below the fracture, and a window cut in the plaster so that the tubes may be removed without disturbing the fixation. At the end of a month the plaster is removed and a skiagram taken. It will usually be necessary to insure adequate fixation for another two months. If the case is doing well, the X-ray will show some absorption of lime salts in the graft, and indications of fusion with the shaft will be apparent. Until the graft has lost its individuality where it is in contact with the receiving bone fixation should be maintained.

THE EFFECT OF THE REMOVAL OF THE GRAFT FROM THE TIBIA.

Of seventy-four cases of which I have personal experience, fracture of the tibia from which the graft was removed occurred in two cases, one six weeks and the other two months, after removal of the graft. I do not think the injury would have resulted in fracture in the normal bone. X-rays taken three months after removal of a graft, as a rule do not show any loss of density in the bone.

WHAT IS THE FATE AND FUNCTION OF THE BONE-GRAFT.

My experience has been of the autogenous transplant only. I believe that the transplanted bone lives and itself takes part in the formation of a new shaft under favourable conditions. What it requires is an early blood supply and adequate fixation to healthy bone. I have not seen cases reported where ivory pegs or dead bone have been used successfully to bridge a wide gap, and I have not had a case in which autogenous bone was not available.

The following cases will illustrate the points to which I attach importance in the selection of cases and the use of the bone-graft:—

(1) Disease of third and fourth lumbar vertebræ, showing graft used for fixation.

(2) Showing correction of genu valgum by transplation of a wedge of bone from the inner to the outer side.

(3) Showing removal of a portion of the shaft of the fibula to replace lost substance in the ulna. This case demonstrates two points: First, that a considerable portion of the middle two-thirds of the fibula can be removed without loss of function, and that non-union was probably due to insufficient contact with the receiving bone.

(4) Ununited fracture of the shaft of the humerus. In this case spontaneous fracture of the graft two months after insertion indicates that its only function was that of an internal temporary splint. Union resulted from contact of the raw surfaces of the main fragments. The graft shows little absorption of lime salts, and this usually indicates loss of vitality of the graft.

(5) Ununited fracture of the neck of the humerus; fourteen months' duration. The upper fragment is too short to allow adequate fixation of graft. Direct apposition obtained by wire and external splintage.

(6) This case illustrates the result obtained by early treatment in a case of loss of the upper third of the humerus, and the result eighteen months after injury. The arm is short but allows a fair range of movement.

(7) Result in a similar case which was not treated on these lines.

(8) Case of an old ununited fracture of the forearm, especially the radius, one usually associated with fixed pronation of the forearm, radial deviation of the hand, with limitation of movement in the wrist and fingers. These should be corrected before operation to restore continuity of the bones. This avoids strain of the graft.

(9) Ununited fracture of both bones of the forearm. Illustrates the length of graft which should be used to insure adequate contact.

(10) Ununited fracture of both bones of the forearm. Preliminary operation, dovetailing of ulna, followed by bone-graft of radius. Owing to extent of scar tissue its preliminary excision was not possible, and the bone-graft of the radius had to be removed six months later because of a persistent sinus. Last X-ray taken twelve months after first operation shows strong union of ulna, radius uniting.

(11) Ununited fracture of lower third of ulna with ankylosis of the radio-ulnar joint. Bone-grafting is contra-indicated in this case, as it would result in loss of the movements of pronation and supination taking place at the site of fracture.

(12) In a similar case of ununited fracture of the upper third of the radius with ankylosis of the superior radio-ulnar joint re-establishment of continuity would result in loss of these movements. In both these cases the fragments are too short to allow of adequate fixation of a graft, and neither are associated with much disability.

(13) Where the lower third of the radius is short, and there is radial deviation of the hand, it is usually better to shorten the ulna and allow direct apposition of the radial fragments, as was done in this case.

(14) Shows gradual absorption of a graft four months after operation. In this case the Wassermann reaction was positive. This factor should have been dealt with prior to operation.

(15) The history of this case is interesting. On July 10, 1916, he sustained a compound fracture of the radius. One year later 1½ in. of the ulna were removed and both bones plated. When I saw him in May, 1917, there was some union of the ulna, but the radius was ununited. The plates were removed, the pronation of the arm corrected and later a graft inserted.

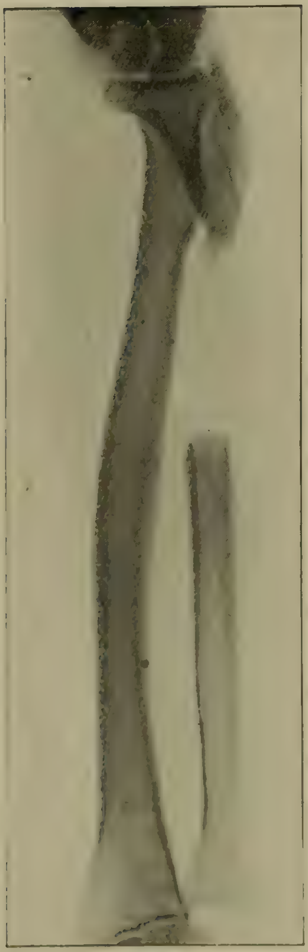

FIG. 1.

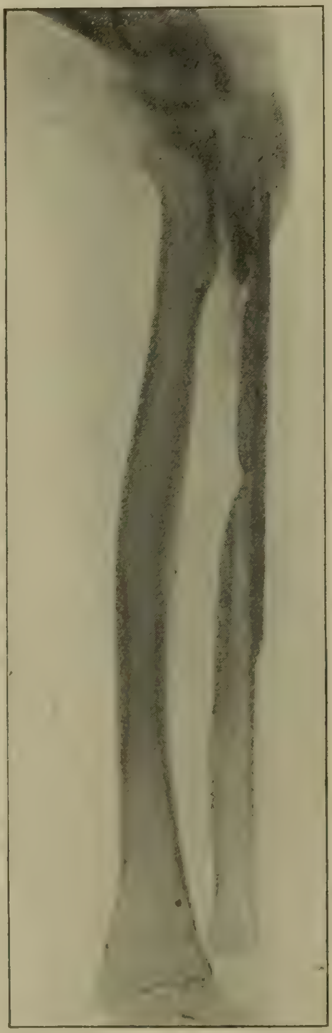

FIG. 2.

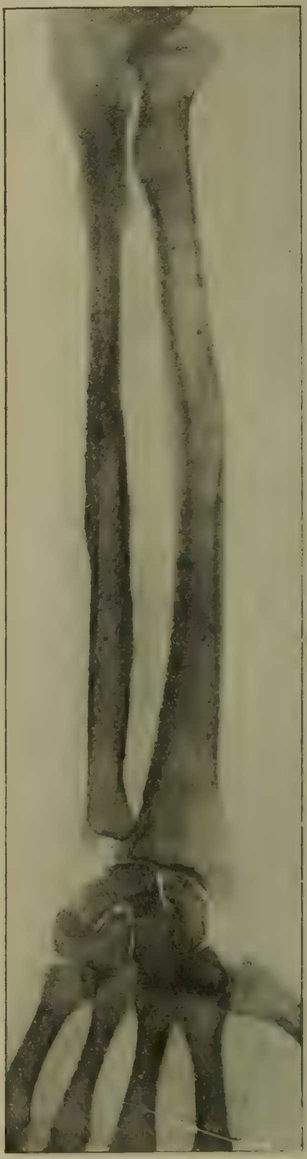

FIG. 3.

Fig. 1 (Case 17).—Condition nine months after wound; 2½ in. gap in ulna.

Fig. 2 (Case 17).—Bone-graft from tibia five months after insertion. Note fusion of graft with shaft and loss of density in graft.

Fig. 3 (Case 17).—Condition one year and eleven months after operation. Graft assuming size and shape of receiving bone. Early appearance of medulla in graft.

The last three cases are those which have convinced me that under favourable conditions the graft lives and itself takes an active part in the restoration of continuity.

(16) Ununited fracture of lower third of humerus, thirteen months' duration. During the operation the lower fragment was completely removed and then fixed by kangaroo tendon to the shaft. Union resulted, and its previous form was maintained.

(17) Shows 2½ in. gap in ulna, of nine months' duration (fig. 1). Bone-graft, October, 1916. X-ray taken five months later shows fusion of graft with shaft and new bone formation between graft and fragments (fig. 2). The next X-ray, taken one year and eleven months after the operation, shows firm consolidation, the graft attaining the size and appearance of the normal shaft (fig. 3). Note also the restoration of medulla in the middle of the graft.

(18) The last case is one of Sir Robert Jones's, illustrating a graft which was itself the site of fracture three months after its insertion, and which united by callus formation apparently like normal bone.

Major ALWYN SMITH, D.S.O., R.A.M.C.

My experience of bone-grafting before the War was mainly limited to the operative fixation of carious vertebræ and as such cases did uncommonly well from the purely operative standpoint, one could not learn much from them. Bone-grafting has a much wider field in war surgery, but the risks and complications of the operation are immeasurably greater. On account of disappointing results with certain surgeons, the operation appears to be losing favour and statements have been made in several quarters that it is hardly justifiable. Although I have had disappointments and failures, I am convinced as to the value of the procedure provided it be limited to cases that do not display complications which we are accustomed to associate with disastrous results. My war-time experience is limited to cases of non-union in long bones, the result of simple or compound fractures, and to cases of bone loss, with consequent hiatus—the result of wounds.

GENERAL CONSIDERATIONS.

It is obvious that more consistent results are to be expected in the young than in the middle aged, in ununited simple fractures than in compound ones that have undergone septic processes. The latter type of case, on account of latent sepsis, damage to, and loss of, soft tissue, and its subsequent cicatrization is apt to end in failure. On account of deformity and disability, a bone-graft is often imperative and the patient is no worse off if failure results, whereas the improvement in function that follows a successful issue is of inestimable value to him. No septic cases should undergo operation—

(1) *Unless discharging wounds have been healed for at least nine or even twelve months.*

The prolonged wait between wound healing and operation is of great importance not only as a safeguard against sepsis but in order to give Nature a chance. I have had cases of non-union of many months' standing, where one has despaired of union taking place without bone-grafting, suddenly unite without apparent reason. The period of waiting should be associated with treatment by immobilization, massage, passive congestion and percussion: the latter by means of a wooden hammer to the region of the fracture.

(2) *Unless a preliminary operation for the removal of scar has been carried out;* or

(3) *Unless a course of provocative massage of a month's duration has been instituted which has not been followed by a "flare up."*

A preliminary operation should always be undertaken where the X-ray shows bone fragments that may be acting as foreign bodies. In cases that have been fully healed for many months, I have found small sequestra and encapsulated abscesses that obviously vetoed a bone-graft.

(4) *Unless the wound can be covered with healthy skin without tension.*

Where operation is contra-indicated on account of skin loss or large adherent scars, pedunculated skin flaps may be taken from elsewhere as a preliminary operation.

FUNCTION AND FATE OF THE GRAFT.

I will now describe cases that exhibited features which may form debatable points with regard to the function and fate of the graft.

In 1911 when the controversy as to the osteogenetic power of the periosteum was much in vogue, I had under my charge in Western Canada a small boy with morbus coxæ. There was an abscess of the joint which had not burst through the capsule, the type of case that frequently bursts through the acetabulum into the pelvis. The child had been immobilized for eighteen months when I saw him and there were no signs of ankylosis taking place. The long rigorous Canadian winter which debars open-air treatment was approaching and as the child was losing ground I resolved to produce an arthrodesis of the hip. On opening the hip-joint a pure tuberculous abscess was evacuated and the head and neck of the bone came away as a sequestrum. I resolved to fix the femur to the acetabulum by means of a bone-spike taken from the tibia. After removing the bone-graft my assistant, owing to misunderstanding, stripped the periosteum from the graft. Having freely curetted the acetabulum and the femoral neck, I drove the bone-peg from the great trochanter through the remains of the neck and ran it into the ilium and thus fixed the femur to the pelvis. Everything went well and firm bony ankylosis resulted. The track of the graft was discernible in an X-ray picture twelve months later. The result of this case seemed to point to the fact that the periosteum is not all-important.

In 1912 I performed an Albee's operation for low dorsal caries. After six months' immobilization the child was allowed up, but twelve months later he was brought back to me with a lesion in the second lumbar vertebra. The lower edge of the graft only extended to the first lumbar vertebra. A second operation to immobilize the diseased vertebra and the two below it was undertaken and it was found that the previous graft had united firmly with the vertebral spines. The point of marked interest lay in the fact that the graft was of stone-like hardness and of a totally different consistency to that of twelve months previously.

In April, 1916, I performed a bone-graft in the ulna, a series of lantern slides of which I show you. Good union occurred, but about ten weeks after operation an impromptu wrestling bout produced a fracture. I knew that Sir Robert Jones had had a similar case previously and the graft had thrown out callus and had re-united. As you will see from the subsequent slides, the very opposite occurred here, the graft becoming disintegrated and finally disappearing, with the exception of that in contact with the host bone. It will be noticed that the gap is very much diminished but that most of the bone regeneration appears to have taken place in the endosteum of the host bone adjacent to the graft and not in the graft itself. If the graft be osteogenetic, why should union not take place and why should disintegration have occurred? I am inclined to think that the graft acts as a scaffolding and has little osteogenetic power of its own. This opens up the argument as to the advantage of autogenous over heterogenous grafts. Possibly heterogenous grafts behave to some extent as foreign bodies, although Clarence Starr, of Toronto, tells me that in the experimental experience of Gallie and himself, open-mesh animal bone, as a graft, thoroughly sterilized by boiling, has been quite satisfactory. If we assume that the graft has no osteogenetic power, we must assume that it receives its nutriment, and is finally reconstructed, from the host bone at either end and also from the soft parts that lie in contact with it, either directly through new vessels in granulation tissue or through the medium of the periosteum that is transplanted with it. It is thus necessary, if our premises are correct, to make sure at the operation that whatever area of graft is in contact with host bone must be in close contact with it and must be in contact with healthy bone, which should, if possible, include the region of the medullary cavity on account of its vascularity. From the practical standpoint, the use of high speed circular saws may to some extent be a disadvantageous factor in the early vascularization of the graft on account of eburnation due to heat and the clogging of lacunæ by fine bone dust.

At the site of non-union in old septic bone injuries, the bone is invariably devitalized; it is absolutely avascular and looks like compressed sawdust, but has a much harder consistency. I regard this as quite inefficient for the production of union and I invariably remove, by the aid of nibbling forceps, the ends of the bones, until vascular healthy bone is reached; this preparation I consider of great importance. The soft tissue bed in which the graft is to lie will aid in its nutrition; it is thus necessary to make sure that scar tissue is freely removed and that hæmostasis is absolute. I once lost a very promising graft as the result of the formation of a hæmatoma which was allowed to remain.

If we assume that a graft derives the majority of its nutrition from the host bone, it would be interesting to know how long a period of time elapses until the graft becomes totally revivified.

In the case quoted of Sir Robert Jones, of fracture of the graft, the fracture took place seven months after the operation; in my case the period of time between graft and fracture was only ten weeks. I have never felt satisfied that a graft is safely reconstructed till after at least three months and this period of time will obviously be increased proportionately with the density of the graft and with the distance between the ends of the host bone. I have thought that some grafts become softened between the second and third month, especially if the bridge be a long one, and from a practical standpoint it is unadvisable to allow much latitude to the patient for at least four months. The photographs of a 4-in. gap in the ulna illustrate this point. The patient played a game of tennis eight weeks after operation, but I forbade a repetition for another two months for the reason I have given.

Where a graft partly fails and becomes united at one end only, the question arises as to whether it will persist and become living bone in whole or in part, and what factors will aid or diminish such chances. The presence of mild sepsis or an unfavourable bed will certainly have a deterrent action. The prints I show you are of a bone-graft of the humerus performed in April last. Firm union took place at the lower end, but the upper end came away as the result of faulty immobilization. Seven months later a second operation was undertaken to freshen and approximate the fragments, and it was found that the upper free end was devitalized and sclerotic, and had become tapered in shape. The bone was drilled in several places, and it was discovered that the graft was only vascular for about one inch above its union with the lower end of the humerus. The graft was mainly used as a fixation point for the phosphor-bronze wire used at the second operation. Union has now taken place, and the endosteum of the upper fragment of the humerus appears to be growing round the sclerotic portion of the graft.

The question of unilateral fixation to host bone opens up a big problem. The pretty operations that were devised to substitute the head and shaft of the fibula for corresponding missing portions of the humerus, in order to reconstruct the shoulder-joint, have not stood the test of time. The same results are applicable to Lexer's work in joint transplantation. Failure is due to the inability of the host bone to reconstruct the graft before it dies. The osteoblasts transplanted with the graft can only prevent its death provided a new circulation is rapidly established along its whole extent.

The question as to what length of time may elapse before a bone-graft that has apparently not "taken" at one end is capable of union appears to be doubtful. The ununited portion is capable of union after a prolonged period, provided the free end is in close contact with host bone. The prints shown are those of a man who lost 3 in. of the tibia in October, 1915. Two years later a slide inlay was performed in a hospital in this country. Nine months later I saw him as a pensioner, the graft ununited at one end, the limb flail-like, the patient walking on crutches, never having put his foot to the ground. The bone surfaces at the site of union were closely approximated, and no tapering of the extremity was evident. It was decided to try the effect of function without weight bearing. A calliper splint was fitted, and massage and percussion were instituted. The patient was told to walk as much as possible in his appliance. After six months it was found that the graft had become much thicker and that a large amount of callus was being thrown out at the site of fracture. Union has now taken place. What had happened during the first nine months? I imagine that full vascularization and reconstruction of the graft had occurred, and that with the added stimulus osteogenesis became possible.

STATISTICS.

From my records I have collected thirty-one cases of war-time grafting; some of these were due to simple ununited fractures, but the majority are old septic gunshot fractures. Of these cases there were: Ulna nine, radius six, humerus five, femur five, tibia four, clavicle one, fibula one. Of the thirty-one—twenty-two were successful, four were partially so, that is to say, the graft united at one end, the remaining five were failures all due to sepsis. The graft was removed in three cases, and in two emergency amputation was required; there were no deaths.

The worst results were obtained in the humerus, mainly, I am sure, due to difficulty in immobilization. Five cases—no complete successes, three partial successes and two failures. It is questionable whether it is not advisable to sacrifice the length of the humerus by means of step-cut operations rather than to attempt to preserve length by means of bone-graft bridges. A shortened arm is a disability of little moment. From the operative standpoint the following results are of importance: (1) Perfect asepsis, (2) perfect hæmostasis, (3) close coaptation between host and graft, (4) rigid fixation of graft to host bone, (5) rigid immobilization of the limb.

With regard to (5), in bone-grafts of the femur I obtain immobilization by means of a Thomas's bed splint and have had no failures. For fixation I use fine phosphor bronze wire cable—the so-called Vienna silk. I have given up the use of kangaroo tendon and chromic catgut. I use autogenous tibial grafts, consisting of the whole thickness of the antero-internal surface of the bone, including the periosteum that overlies the graft. A slide inlay of bone may be used, but if it has become soft and atrophic, as the result of long disuse of the limb, it is not satisfactory as it is apt to break with the slightest movement before its reconstruction is complete. All grafts should be of sufficient length to be in juxtaposition with each segment of the host for at least one inch—two inches if possible. Where possible, comminution by a chisel of the free ends of the host bone should be practised. I use a motor-driven circular saw, but endeavour to prevent the bone becoming heated by the use of saline drip. The limb should be immobilized for at least twice as long as for an ordinary fracture, but, generally, massage and active movement of the muscles that overlie the graft can be practised at an early date. Forty-eight hour drainage by means of rubber tissue is of advantage in most cases, especially where scar tissue remains and post-operative oozing is to be expected.

The following communications have also been made before the Section :—

PRESIDENT'S ADDRESS :

Sir J. BLAND-SUTTON, F.R.C.S.: "Spolia Opima." October 23, 1918. Printed *in extenso* in the *British Medical Journal*, November 30, 1918, p. 593.

DEMONSTRATION :

T. S. KIRK, M.B. (Belfast): Demonstration of the P. K. Arm. November 5, 1918.

DISCUSSION :

Major ROBERT MILNE, R.A.M.C. : Contribution to "Discussion on Bone-grafting" (taken as read). January 22, 1919.

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Section of Surgery.

President—Sir JOHN BLAND-SUTTON, F.R.C.S.

Carcinoma of the Appendix.[1]

By JOSEPH E. ADAMS, F.R.C.S.

CARCINOMA of the appendix possesses a twofold interest in that it is an unusual manifestation of pathological change in an organ especially prone to inflammatory disease, and that it may also throw some light on the causation of an uncommon variety of intestinal cancer. Most surgeons will agree as to the rarity of the condition, though some American authors have stated that microscopical sections of large numbers of appendices, examined as a routine practice, have proved its occurrence in between 0·4 and 0·5 per cent. of the cases where operation has been performed for attacks of appendicitis.

Deaver,[2] writing in 1914, states that the number of recorded cases up to 1908 was 120, and he adds that with increasing microscopical examination the condition has ceased to be a rarity. This may be so in America, but in this country such cases are still far from common, and I can only trace four in the last seventeen years at St. Thomas's Hospital, during which period over 7,000 appendicectomies must have been performed. It is true that microscopical examination of the organ is not undertaken as a routine practice, but such appendices do as a rule present macroscopical abnormalities, and when these are noticed the aid of a pathologist is usually invoked. One of these four cases was classified as an endothelioma, but for purposes of description I think other authors have included these among carcinomata, and this is perhaps justified by the fact that the type which is most prevalent is the spheroidal-celled—cancer occurring in young subjects, a large proportion even before puberty. I am indebted to Deaver's work for many of the following details:—

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[1] At a meeting of the Section, held May 7, 1919.

[2] John B. Deaver, "Appendicitis," 1914.

Age-incidence.—Fifty-four per cent. of Harte's recorded cases were under 30 years of age, the youngest being only 5. Obendorfer discovered this lesion in the appendix of a child only 7 days old. Numerous cases have been recorded before puberty. Practically all these appendices were removed for attacks diagnosed as appendicitis, and the discovery of carcinoma was made by microscopical investigation.

Type of Cell.—The vast majority belong to the spheroidal, or to use an American term, basal-celled, type of carcinoma. If columnar-celled cancer is found, the average age is about 50. This observation accords with the incidence of columnar carcinoma in other parts of the intestinal tract. The basal-celled growth is much less prone to produce metastatic deposits. The growth is rarely large, and the classical type is often located in the tip of the appendix (90 per cent. according to MacCarty and McGrath). Other authors agree that 75 per cent. of these growths occur in the distal half of the appendix. This condition is slightly more common among females than males.

Deaver states that up to September, 1912, at the German Hospital, Philadelphia, 6,327 appendices had been examined microscopically, and sixteen instances of malignant neoplasm were found. This gives an incidence of 0·25 per cent.

Malignancy.—This is a point of the greatest interest, and it is stated that the majority of the cases are cured by appendicectomy alone. This refers to what I have called the classical type—i.e., spheroidal-celled carcinoma, occurring usually at the distal end and in young subjects. It is characterized by slow growth, absence of early metastases, and rarity of recurrence after removal. In this connexion it must be remembered that a certain proportion of endotheliomata have been included in the recorded cases, and these characteristics apply essentially to this type of semi-malignant growth. In those cases, occurring, like the common forms of intestinal cancer, later in life the malignancy is that of ordinary columnar-celled carcinoma.

The St. Thomas's Hospital cases, all of which have been recorded by my colleagues in the *Lancet*, I have endeavoured to trace in order to ascertain the results of simple appendicectomy.

Cullingworth and Corner[1] found a carcinomatous appendix at an operation in 1901, and recorded it three years later, when the patient, a woman aged 33, was perfectly well. This was a spheroidal-celled carcinoma, and the patient had experienced two attacks of pain in the right iliac fossa, in which a small solid tumour could be felt. Operation revealed a fibromyoma of the right broad ligament, close to but not connected with the uterus, with some adherent omentum, and an appendix free from adhesions with a bulbous enlargement at the tip. The lumen of the appendix was obliterated by this growth, which was hard, but appeared caseous on section, and a suspicion of tuberculosis was aroused. It was held that the fibromyoma rather than the appendix was responsible for the symptoms and physical signs. Efforts to trace this patient have been unsuccessful, so we can only include her among the three year "cures."

In the same year, 1904, Battle[2] recorded a case, also in a female, aged 14, in which the appendix was removed after six attacks occurring at short intervals. No suspicion was entertained before operation that the condition was other than chronic inflammation of the appendix, but when removed it was thought to be tuberculous. There was a bulbous tip, solid with growth, and a stricture in the lumen of the appendix in its proximal half. Sections of this appendix conformed to the spheroidal-celled type, and the growth showed an extreme degree of invasion of the muscular coat. Correspondence with this patient has elicited the satisfactory reply that she is now married and in perfect health. She has one child, aged 5. Freedom from recurrence of intestinal carcinoma after the lapse of fourteen years surely justifies the use of the word "cure."

In 1905 Sargent[3] came across an appendix in an abscess due to what was considered to be the first attack of appendicitis; the appendix was enlarged and caseous on section. A preliminary diagnosis of tubercle was made here, but microscopical examination revealed the structure of an endothelioma. The patient in this case was a girl, aged 12, and she had been ill for nearly three weeks, with acute symptoms for fifty-six hours before operation. There was a large inflammatory swelling in the right iliac fossa, and the case was treated by incision and drainage with immediate appendicectomy. Only the unusual appearance of the appendix caused a microscopical investigation to be made, and the child made a perfect recovery. I have been unsuccessful in getting information as to her present condition.

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[1] *Lancet*, 1904, ii, p. 1340.

[2] "Primary Carcinoma of the Vermiform Appendix," *Lancet*, 1905, ii, p. 291.

[3] "Endothelioma of the Vermiform Appendix," *Lancet*, 1905, ii, p. 889.

My own case is in all essential points similar to Mr. Battle's case. The patient is a girl, aged 12, rather thin and nervous, with a history of "bilious attacks" for some years. The illness for which I was consulted started in November, 1918, and the diagnosis made was appendicitis, owing to the location of pain and tenderness in the right iliac fossa. Abdominal pain on previous occasions had not been referred to this region, and the child herself stated that the pain was "in a new place" The pain persisted in slight degree up to the date of operation in January of this year, when it was expected that an adherent appendix would be found. The appendix, however, proved to be quite free from adhesions, but was enlarged and bulbous in its distal portion for $\frac{3}{4}$ in. The proximal part was empty and healthy. Macroscopically the condition was taken for tuberculosis, as the lumen was obliterated and the mass yellowish-white on section. Microscopically the growth was, like the above cases, spheroidal-celled carcinoma, with extreme invasion of the muscular coat, and no clear evidence that it originated in the mucosa. Appendicectomy alone was performed at the operation, and in view of the generally favourable outlook in these cases, no further surgical treatment has been advised. The child is now perfectly well.

REMARKS.

The outstanding features of interest in these cases appear to be :—

(1) The fact that spheroidal-celled carcinoma is by far the commonest type encountered in cases of cancer of the appendix occurring in young subjects.

(2) That the disease affects the distal portion most frequently, and that the tip of the appendix is particularly liable to attack.

(3) That this part of the appendix is less liable to that irritation which is commonly held to be one of the factors in the causation of intestinal carcinoma. It is obvious that every portion of fæcal matter which leaves the cæcum and enters the appendix must pass over some part of its proximal end, but a large proportion of such irritant matter may never reach the tip of the appendix.

(4) It would seem, therefore, that this particular form of growth belongs to what may be termed the "unsuspected carcinomata," similar

to that which is sometimes met with in the thyroid, when a lobe is removed because of enlargement, and the diagnosis of malignancy is forced upon us by the absence of colloid material and the profusion of irregularly multiplying cells.

(5) It is possible that if all vermiform appendices were submitted to microscopical examination after removal, the percentage of these cases of carcinoma would be found to be higher than at present appears. It is doubtful, however, whether in this country it would reach the high figure of 0·5 per cent. given by some American authors.

(6) The fact that all these cases were mistaken for tubercle on naked-eye examination is interesting, and is proof of the rarity of carcinomata as well as the frailty of unaided surgical eyesight. It would certainly appear that accurate clinical diagnosis is not to be expected.

(7) In Sargent's case there was apparently no evidence that the neoplasm caused the abscess, and I believe that the absence of inflammation around the growth is rather a feature of these cases. This is in accordance with the observation that they exhibit no ulceration of the mucous membrane, but rather obliteration of the lumen.

(8) If the favourable prognosis after simple appendicectomy be correct we are justified in taking pride in such a simple cure for cancer. But it makes us wonder whether such lesions occur without giving rise to symptoms. Furthermore, recurrence of carcinoma is not unknown ten or even twenty years after apparently successful removal by operation. No statistics are available as to the length of time these appendicular cancers have been observed to be free from recurrence or metastatic deposits. Of the three cases about which I have inquired only one has furnished any evidence, and this is entirely satisfactory. My own case I shall endeavour to keep under the closest observation.

Sir HUMPHRY ROLLESTON: In 1906 Mr. Lawrence Jones[1] and myself analysed forty-two cases of primary malignant disease of the vermiform appendix, thirty-seven of which (88 per cent.) were described as carcinomata. A distinction should be drawn between *(a)* the columnar-celled growths, which probably are derived from the cæcum and are clinically malignant, and *(b)* the small spheroidal or polyhedral-celled growths which are the characteristic form in the appendix and, though carcinomatous from the microscopical point of view, are not malignant clinically. Both structurally and prognostically this form of appendix carcinoma resembles the group of cases of multiple primary carcinomata of the small intestine described by Bunting, and also the basal-celled tumours of Krompecher, of which multiple growths have been recorded in the scalp. I know of four examples of primary carcinoma of the vermiform appendix that have been detected microscopically in the routine examination of appendices at St. George's Hospital; the first published in 1900 had soon afterwards abdominal symptoms suggesting a recurrence, but the patient was quite well in 1905.

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[1] *Med.-Chir. Trans.*, 1906, lxxxix, p. 125.

The President, Sir JOHN BLAND-SUTTON, F.R.C.S., delivered a lecture entitled "Missiles as Emboli," printed *in extenso* in the *Lancet*, May 10, 1919, p. 773 (with illustrations).

Section of Surgery.

SUB-SECTION OF PROCTOLOGY.

President—Mr. F. SWINFORD EDWARDS, F.R.C.S.

Case of Complete Resection of the Large Bowel for Multiple Adenomata.[1]

By J. P. LOCKHART-MUMMERY, F.R.C.S.

T PATIENT, a young woman, aged 22. At the age of 16 she had begun to suffer from diarrhœa with the passage of large quantities of blood and mucus. She became very weak and anæmic. No treatment was effectual in alleviating the condition, and she went on gradually getting worse. In the early part of 1918 she came into St. Mark's Hospital. Examination with the sigmoidoscope showed numerous adenomata in the rectum and sigmoid, the largest of which was about the size of a walnut. They were very numerous and bled easily. The symptoms pointed to there being adenomata throughout the large bowel.

Operation.—The abdomen was opened in the mid-line, and on exploring the colon numerous large polypi could be felt as high up as the cæcum, and all through the transverse colon. The small intestine was divided 6 in. from the cæcum, and an end-to-side junction made with the rectum. The whole of the large intestine was then removed down to the point of union. The whole operation was done at one sitting. The patient made a complete recovery, and has since been earning her own living. Since the operation she has put on 2 st. in weight, and the only inconvenience from which she suffers is that the bowels act from three to four times a day, with semiformed stools. She is also rather more thirsty than the ordinary individual.

[1] At a meeting of the Section, held May 14, 1919.

The specimen exhibited shows multiple adenomata of a simple character throughout the entire large intestine.

Mr. IVOR BACK: I am interested to see this case, in which the colon has been removed for a condition described as "mega-colon," a name which would include many disorders of the large bowel. I hope this case may provoke a discussion upon (1) the indications for, and (2) the technique of complete colectomy. For example, is it a justifiable operation in a case of carcinoma of the centre of the transverse colon? It is certainly easier to perform than an excision of the growth with end-to-end anastomosis of the colon in that position; and it must surely diminish the liability to recurrence. Further, is it indicated in cases of chronic intestinal stasis? and if so to what degree must the disease have advanced to justify it?

Case of Mega-colon (Hirschsprung's Disease).

By J. P. LOCKHART-MUMMERY, F.R.C.S.

B. C., FEMALE, aged 26; has always been constipated. As a child she frequently went three weeks without an action of the bowels. She has had two children. During the last pregnancy the condition was much aggravated, and at the time the child was born the bowels had not been opened for two months. When admitted to hospital the patient's bowels had not been opened for twelve weeks in spite of aperients, and she complained that during the last week or two she had suffered a good deal of pain in the abdomen and back. Her general condition is good, she does not feel ill, and she has not suffered from headaches. Lately she has had a good deal of difficulty in passing urine. The abdomen is enormously distended, about the size of an eight months' pregnancy, and well marked peristaltic waves can been seen through the abdominal wall. The dilatation of the bowel appears to come right down to the anus.

Case of Mega-colon (Hirschsprung's Disease), with Secondary Carcinoma.

By J. P. LOCKHART-MUMMERY, F.R.C.S.

THE patient is an ex-soldier, aged 54. According to his history the bowels acted normally until seventeen years ago, when after an attack of dysentery in India he began to suffer seriously from constipation.

Since then the constipation has been very severe, and he has gone for long periods without any action, and during these periods his abdomen became tremendously distended. When admitted to hospital he had an enormously distended abdomen with great waves of peristalsis passing across it. Just within the anus there was an adeno-carcinoma which appeared to be due to the irritation from the great weight of fæcal material above it. On exploring his abdomen I found that the dilatation involved only the sigmoid flexure. This, however, occupied the entire abdominal cavity, was over 6 in. in diameter, and its walls were nearly ½ in. thick. The dilatation extended right down to the anus, and the rectum came right out to the pelvic walls all round.

Mr. LOCKHART-MUMMERY (in reply to remarks made) : I think there can be no doubt that a real muscle hypertrophy of the bowel wall is present in these cases, and that most definite and powerful contraction can be demonstrated. My own opinion is that the condition is due to some disease of function, probably of the nature of reversed peristalsis in the affected segment of bowel.

Case of Chronic X-ray Dermatitis of the Anal Region, excised Eighteen Months ago.

By J. P. LOCKHART-MUMMERY, F.R.C.S.

J. C., AGED 48, was operated on at St. Thomas's Hospital two years ago for a fistula. He was subsequently treated for pruritus ani by X-rays. Presumably he got a severe X-ray dermatitis which appears to have been excised in the German Hospital about eighteen months ago. There is now dense induration of the skin over the coccyx and behind the anus with superficial cracks which refuse to heal.

Case showing Result of Resection of Rectum for Carcinoma.

By PERCIVAL P. COLE, F.R.C.S.

PATIENT, a male, aged 58. The abdomino-perineal operation was performed on May 25, 1917. The patient was discharged from hospital on July 19, 1917, and began work on August 1. He now complains of pain in the lower sacral region. There is no evidence of recurrence.

Two Cases illustrating the Result of Resection in Complete Prolapse of the Rectum.

By Percival P. Cole, F.R.C.S.

(I) Patient, a male. From 6 in. to 8 in. of bowel became prolapsed at the slightest strain. Two previous operations had been performed without in any way relieving the condition.

(II) The second patient, a female, is a case of a similar nature.

Case of Recurrence in the Posterior Vaginal Wall Three Years after Abdomino-perineal Excision for Carcinoma Recti.

By W. S. Handley, M.S.

A. B., female, aged 46, was admitted to the Middlesex Hospital, in February, 1916, for a growth on the anterior rectal wall. For two years she had been troubled by prolapse of piles after defæcation, which she used to reduce herself. Ever since this time she has had pain in the rectum unaffected by defæcation. Examination under anæsthesia showed a firm nodular swelling, evidently a carcinoma, on the anterior rectal wall. On February 17, 1916, an abdomino-perineal excision of the rectum was performed. Although the patient was a woman of frail physique, she made a good recovery from the operation, and left the hospital on March 22. She remained in good health, but on attending the hospital for examination in November, 1918, a small recurrent nodule was found in the posterior vaginal wall, opposite the point of origin of the primary growth in the rectum. She was advised to come in immediately for its removal, but for family reasons declined to do so. She was again seen in March, 1919, and an ulcerated mass about $1\frac{1}{2}$ in. in diameter was now found on the posterior vaginal wall. There were also some enlarged glands in the inguinal region on both sides. About April 24 the recurrent mass was excised and the vagina was restored by suture. A 50 mg. tube of radium was left in the post-vaginal tissues for twenty-four hours. A few days later the glands in the groin were removed. The patient is now convalescent.

The case is shown because it is of interest to determine what are the likely seats of recurrent growth after the abdomino-perineal operation. It also illustrates the possibility of dealing operatively with certain forms of recurrence after excision of the rectum.

Gunshot Wounds of the Great Bowel and Rectum.

By ARTHUR KEITH, M.D., F.R.C.S., F.R.S.

PROFESSOR ARTHUR KEITH exhibited a series of preparations, from the War Office Collection of Pathological Specimens, illustrating wounds of the great bowel and rectum, and a series of macerated pelves showing the nature of the bone injuries which accompany wounds of the pelvic viscera. A review of the histories relating to these specimens led him to infer that injury and infection of the pelvic subperitoneal tissue were just as fatal as penetration of the peritoneum and laceration of the bowel. A study of the pelvic specimens also showed the widespread effects of modern missiles of high velocity. In one case in which a bullet passed through the pelvis from side to side, merely grazing the margin of the ischium, the force of the missile had been so diffused that the sacrum was broken transversely at the level of its third vertebra, while in front the pubic ramus was broken on both sides. In such cases the pelvic viscera were bruised and the subperitoneal tissue pervaded by effused blood. An appendix was shown—the sole viscus to be injured in a case in which the missile had entered the abdominal cavity.

Sir GORDON WATSON, C.M.G.: There is no doubt that as Professor Keith surmises, injuries in this region are frequently followed by infection of the pelvic cellular tissue and are then extremely fatal. For this reason, quite early in the war, many of us realized that it was advisable to perform colostomy for practically all wounds of the rectum irrespective of their severity. The high mortality of rectal wounds was largely due to the fact that they were complicated by wounds involving either the bony pelvic wall, the bladder, the intestines, buttocks, hip joints, &c. It is convenient to classify wounds of the rectum into intra- and extraperitoneal, but the combination of the two is not infrequent. The treatment of these cases often presents great difficulties. Small intraperitoneal wounds can sometimes be sutured, but even when this is possible, colostomy is advisable. Large lacerated wounds are more commonly met with. They are usually associated with perforations of the small intestine and extensive injury to the pelvic wall. A long operation becomes necessary in order to excise all damaged tissues, perform colostomy, and pack and drain the pelvis. The mortality in these cases is so high that in some instances an abdomino-perineal excision has been performed in the hope of preventing acute sepsis. Major Gordon Taylor performed this operation twice. In one case the patient did well for nine days, but unfortunately lost his life under an anæsthetic given to dress the wound. The cases are so desperate that such heroic measures are often justifiable. As regards colostomy, it is often advisable, and indeed necessary, to perform transverse colostomy because of damage to, or effusion of blood into, the pelvic mesocolon. The purely extraperitoneal wounds require very free excision of soft parts, and very liberal drainage of the damaged bowel, in addition to colostomy. In a few favourable cases colostomy can be delayed and only be made use of as a secondary operation if the primary operation of free excision and drainage does not meet the situation. Occasionally in extraperitoneal wounds involving the posterior part of the rectum, delayed primary suture has produced a satisfactory result without colostomy. Whenever this line of treatment is contemplated, a large tube should be passed through the sphincter. Through and through wounds of the buttock usually call for free excision and are often suitable for delayed primary suture. Some of these cases are complicated by injury to the rectum, and unless this is recognized, the treatment of the buttock wound will fail. Perineal wounds involving the anal canal without peritoneal injury should be treated like fistulæ by free excision and division of the sphincter. In a previous communication to this Section I referred to the remarkable explosive effect which may be produced by a bullet passing across the perinæum deep to the surface. The skin around the anal margin may be completely torn from the margin of the sphincter round the entire circumference, and the sphincter is then drawn upwards so that at first sight it appears as if the lower part of the anal canal had been shot away. I have seen several of these cases and they closely resemble one another.

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SECTION OF THERAPEUTICS AND PHARMACOLOGY.

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April 15, 1919.

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A New Specific Antituberculous Medicament 1

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

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Section of Therapeutics and Pharmacology.

President—Sir WILLIAM HALE-WHITE, K.B.E., M.D.

A New Specific Antituberculous Medicament.[1]

By E. A. BOSSAN, M.D., and A. BALVAY, M.D.

THE waxy envelope of the tubercle bacillus is an evident means of protection to the bacillus. Experiment shows that the acid-fast bacilli are neither reabsorbed nor destroyed by the phagocytes [1]. The phagocyte disseminates the bacillus in the organism, but never destroys it. Resistance to tuberculous infection is, therefore, the greater according as the blood contains a larger quantity of lipolytic ferments.

Carrière [3] and Clerc [2] have carried out interesting researches dealing with the richness in lipase of the serums of many animals.

Carrière [3] shows that the serum of the guinea-pig, the extreme susceptibility of which to tuberculosis is well known, contains the smallest quantity of this lipase.

Metalnikoff [4] proved that the mite attacking beehives is quite refractory to the action of tuberculosis because of the very great lipolytic power of its serum.

Noel Fiessinger and P. L. Marie [5], who repeated the experiments of Metalnikoff, insist on the fact that the waxy or fatty envelope of the tubercle bacillus is a true envelope of protection; the organism must, therefore, lipolyse and then bacteriolyse those bacilli in order to defend itself against penetration by microbes. The lipase "sensitizes," as we may say, the tubercle bacillus by destroying its waxy envelope [6]. Those animals, the lipase of which is particularly active, phagocytose and destroy the injected tuberculous bacilli very quickly. These authors consider the lipase of the mite to be the cause of its immunity.

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[1] At a meeting of the Section, held April 15, 1919.

E. Schulz [7], then one of us [8] mentioned by Grasset [9] state that in the case of tuberculous subjects, whose defensive reaction is sufficient, the bacilli which can be stained by Ziehl's method become fewer in number, and are replaced by the lipolysed granulous forms. Therefore, "we think that the increase of the local lipasic activity constitutes one of the most important means of defence for the tuberculous lung" [10].

Metalnikoff [4], Deÿcke and Much [11], have isolated the bacillary waxes by chemical means, and have tried, by dissolving them in oils (nastin, tuberculo-nastin dissolved in olive oil) to manufacture a vaccine which produces the appearance of that specific lipase.

Deycke [11], Citron, and Müller [12], showed that the injection of the wax of the tubercle bacillus produced some lipolytic antibodies in the bodily organism. But these authors could do no more than obtain insufficient results in the treatment of tuberculosis.

But, as Metalnikoff rightly said [13], the tubercle bacillus wax, though as in the case of the tuberculin, endowed with certain immunizing powers, is quite unable, of itself, to confer perfect immunity. In order, therefore, to confer that immunity, or at least to combat the invasion by the bacillus successfully, we must *immunize with the sum total of toxic substances contained both in the bacillus itself, in its waxy envelope and in the medium in which it lives.*

The organism must be able, not only to neutralize the toxins but also to bacteriolyse the tubercle bacilli by first destroying their waxy protective envelopes, that is by lipolysing them, thus making it possible for them to be easily reabsorbed or destroyed by the phagocytes.

For many years we have done our best to fulfil those indications, and to find out the way to extract *directly* from the tubercle bacilli, the waxes and the substances that naturally adhere to those waxes [14] without transforming them or destroying them by manipulation, or by treatment with acids, ethers, chloroforms, xylol, heat, &c., which neutralize the greater part of their antigenic powers.

Relying on the work of Professor A. Borrel, of the Pasteur Institute (whose valuable and kindly help we gratefully acknowledge here) with reference to the dissolution of waxes of the tubercle bacillus in oils and animal fats [15] we have discovered a method which will not in any way alter the treated bacilli that may afterwards be shown to be alive by their culture in glycerinated bouillon. We, therefore, absolutely respect the constitution of our antigen, thus preserving its powers in the highest degree.

Our specific medicament contains, therefore, the bacillary waxes and all that may be dissolved by that process out of the toxins and the bacillary substances contained in the bacillus itself. Their presence is proved by the local and general reactions which follow the subcutaneous injections.

Waxes being, as Macé says [16], "the impregnated substrates of true active products of tubercle bacilli," their dissolution in our medium and by our process, which does not alter them directly, embodies them in the medicament. Our medicament is then really *specific* because it both contains and sets in action the sum total of active principles. By means of its use, we induce the organism to produce antibodies in *quantity* and *quality* necessary and sufficient for preservation as a therapeutic agent of a preceding infection.

The experiments carried out on animals have proved to us the innocuousness of that product and the power acquired by the blood of treated animals to lipolyse and to bacteriolyse the tubercle bacilli *in vitro* [17]. In our first experiments we did our best to obtain a vaccine producing only very little or better still, no local or general reaction; this vaccine may be administered subcutaneously or intravenously. We shall refer to this at a future date in a fresh series of studies yet to be published relating to the preventive vaccination of bovine animals; these studies and experiments appear, so far, to have yielded excellent and encouraging results. But, being aware of the difficulty of the passage of antibodies through the fibrous and not very vascular strata that surround tubercular lesions, a difficulty which Wright and Sahli have already emphasized, we carried out a fresh series of experiments and endeavoured to inject our medicament directly at the level of the tubercular lesions themselves, that is to say, in the case of pulmonary tuberculosis we made the injections by the intratracheal route. We have been encouraged in our researches by the works of La Jarrige [18], mentioning the experiments of C. Bernard, the thesis of Delor [19], Guisez and Stodel [20], G. Rosenthal [21], Berthelon [22].

One of us (Balvay), who introduced Forlanini's method into France [23], benefiting by that author's great experience in the treatment of cases of pulmonary tuberculosis, applied that method in the exhibition of our specific medicament. He obtained positive results; the proof of which is supplied by observations hereafter to be mentioned.

First of all, we made sure of the penetration of our medicament into a healthy and into a tuberculous lung. We were then enabled to demonstrate [24] with the assistance of our friend, Dr. Guieysse, professor of histology, that not only are the fatty bodies which compose it, the presence of which is easily made evident by the osmic acid, found throughout the whole extent of the lung, but that they also penetrate into the tubercular tissue.

(Section of the lungs of a tuberculous rabbit killed twenty-four hours after an intratracheal injection of ½ c.c. of medicament were shown.)

We do not think there is any need to insist on the importance of such a statement from the therapeutical standpoint. In the face of such results, and with a view to making the injection by the intratracheal route, which has been proved to be without danger in experiments on tuberculous animals, we have modified the composition of our medicament, chiefly by increasing the quantity of waxes and toxins contained in it. We have noticed that the subcutaneous injection of 1 c.c. has always brought about general and local reactions (erythema, nodules, distinct elevation of temperature); such reactions may supervene after the first or after the third or fourth injection; this was shown long ago to be the case by Levene [25]. On the contrary, when subjects of pulmonary tuberculosis are treated by intratracheal injections, we have never noticed any reaction no matter how great the dose injected.

We must, therefore, seek to discover whether the vaccine is not modified at the level of the broncho-pulmonary mucous membranes, or whether the antibodies produced by the vaccine at the level of the lesions themselves are immediately taken up by the antigens, and the reaction fails to take place merely because they are not utilized. Relying on that hypothesis, we injected 1 or 2 c.c. of our vaccine into the trachea of six patients suffering from surgical tuberculosis, but whose lungs were healthy. In each case the elevation of temperature was the same as that which follows subcutaneous injections The reaction has always been positive (Balvay, Godlewsky, Bouis). It was evident therefore (1) that the vaccine did not undergo any modification at the level of the broncho-pulmonary mucous membrane; (2) that when the antibodies produced *in situ* were immediately taken up by or fixed on the antigens there was no reaction. The practical deduction is that the vaccine must be injected directly to the level of the lesions. The method is applicable also in the case of surgical tuberculosis. Breslauer [26] appears to have had some idea of the application of this method.

These facts will perhaps enable us to supply the explanation long sought for, as to the absence of reaction when tuberculin is injected into a healthy animal. We think this absence of reaction in healthy animals can be explained by the fact that according to well established evidence the healthy organism never produces tuberculous antibodies. The antibodies produced in a tuberculous person far from the lesions and, in consequence, not immediately utilized, would be, on the contrary, the cause of these reactions. Our experiments dealing with that question will soon be published.

As many as eighty patients suffering from pulmonary tuberculosis have been treated for more than thirteen months by intratracheal injections of our specific medicament; their ages vary from 17 to 47. We treated patients suffering from various lesions (fibrous cases, exhibiting recent evolution of the lesions, fibro-caseous, caseous, those in the cavity stage; all of them with open lesions, and most of them in the febrile stage). The result of treatment has shown that our specific medicament produces its maximum effect in patients whose lesions are entirely tuberculous and whose expectoration is very small. Hence the necessity for getting rid of the microbic associations and of lessening, as much as possible, the expectoration of certain patients. That result has been obtained by the method of intratracheal injections of gomenol oil at 5 per cent. In the case of patients whose expectorations are abundant, we daily inject into their trachea 5, 10, or 20 c.c. of gomenol oil. Those injections are made under the control of the laryngeal mirror, and have never given rise to the least accident. During the days following the first injections they usually set up an abundant expectoration, which diminishes rapidly in quantity until, after two or three weeks of treatment, it ceases. That period of intratracheal injections in reality constitutes a period of pulmonary cleansing.

Serial examinations of the sputum of these tuberculous persons prove that the bacilli have first a tendency to lessen in number, afterwards that their number diminishes but very little, and that the bacilli never disappear entirely from the expectoration. When the expectoration is greatly reduced, no matter whether the result has been obtained by intratracheal injections or by the fact of the sputum not being originally abundant, we commence the intratracheal treatment by our vaccine. Each patient is daily injected intratracheally with 2 or 4 c.c. of the medicament.

The observations noticed after those injections are the following: Progressive diminution of the temperature, a better general state of health, regular increase of weight, and upon auscultation, a tendency of the pulmonary lesions to a fibrous transformation.

The most striking result of these injections is that they are followed by constant modifications supervening in the morphology and the number of the bacilli of patients treated in that way. They consist in the fact that nearly all the bacilli are lipolysed and bacteriolysed, and in the usual and transitory increase in the number of bacilli without any increase in the expectoration.

Those modifications and that elimination are very quickly followed by the disappearance of bacilli from the sputum.

The first modifications usually make their appearance after the third week, and the disappearance of bacilli after six weeks or three months of treatment.

CONCLUSIONS.

(1) In pulmonary tuberculosis our specific medicament must be brought up to the level of the pulmonary lesions, into which we have proved that it penetrates. That result is obtained by the method of intratracheal injections. In the case of abundant expectorations, preliminary cleansing of the lung is necessary.

(2) When introduced by the intratracheal route, the specific medicament seems to act very satisfactorily on the temperature, on the general condition, the weight, and on the lungs. Invariably it produces changes in the morphology of the tubercle bacilli (lipolysis and bacteriolysis), a transitory increase in their number, and, after that, their elimination; that is, the disappearance of the bacilli from the sputum after a treatment of from one to three months. *This last stated fact indicates the important part played by the medicament in the social struggle against pulmonary tuberculosis.*

(3) Its employment has never given rise to the slightest untoward symptom. We would specially call attention to the fact that we have had the opportunity of following the case histories of a certain number of our patients for more than ten months. In all cases, the good results noticed when they left the hospital have been maintained, although they have started work again, and sometimes very hard work. These results are recorded down to October, 1918. It is our intention shortly to furnish a further account, with notes of observations, on many other cases equally demonstrative of the value of our method of treatment.

REFERENCES.

[1] Borrel, A. "Bacilles tuberculeux et para-tuberculeux," *Bull. de l'Inst. Pasteur*, 1904, ii, pp. 409, 457, 505.

[2] Clerc. "Contribution à l'étude de quelques ferments solubles," *Thèse de Par.*, 1902.

[3] Carriere, C. R. *Soc. de Biol.*, 1899, ii, sér. 1, p. 989.

[4] Metalnikoff. "Contribution à l'étude de l'immunité contre l'infection tuberculeuse," *Arch. des Sci. Biol. de Petersbourg*, 1907, xxiii, No. 2, November, et xii, Nos. 4 et 5.

[5] Fiessinger, Noel, et Marie, P. L. "Les ferments digestifs des Leucocytes," Par., 1910, p. 134.

[6] Gilbert et Weinberg. "Traité du Sang," 1913, p. 321.

[7] Schulz, E. "Ueber die granuläre Form des Tuberkulosevirus im Lungenauswurf," *Deutsch. med. Wochenschr.*, 1909, xxxv, p. 1569.

[8] Bossan, E. A. "Immunothérapie antituberculeuse," *Gaz. des Hôp.*, 1911, lxxxiv, pp. 123, 137.

[9] Grasset. "Thérapeutique générale fondée sur la Phisio-pathologie," p. 191.

[10] Fiessinger, Noel, et Marie, P. L. Loc. cit., p. 133.

[11] Deycke und Much. *Münch. med. Wochenschr.*, 1909, lvi, p. 1885; 1913, lx, pp. 119-190.

[12] Müller. "Ueber des antigenen Charakter des Tuberkelbazillenfette," *Wien. klin. Wochenschr.*, 1917, No. 44.

[13] Metalnikoff. Loc. cit.

[14] Leber und Steinharter. *Münch. med. Wochenschr.*, 1908, lv, p. 1324. Kleinschmidt, *Berl. klin. Wochenschr.*, 1910, xlvii, p. 59. Auclair, "Etude expérimentale sur le poison du bacille tuberculeux humain," *Thése de Par.*, 1897, et *Arch. de méd. experiméntale*, 1897, ix, p. 1124. Auclair, "Les poisons du bacille tuberculeux humain: la degénérescence caséeuse," *Rev. de la tuberculose*, 1898, vi, p. 97. Auclair, "Les poisons du bacille tuberculeux humain," *Arch. de méd. expér.*, 1899, xii, p. 189.

[15] Borrel, A. Loc. cit.

[16] Macé. "Traité pratique de Bactériologie," i, p. 709.

[17] Bossan, E. A. "Lipolyse et bactériolyse du bacille tuberculeux," *Progrès méd.*, 1918, March 23.

[18] La Jarrige. "Des injections intrapulmonaires," *Compt. rend. de la Soc. de Biol.*, 1893, sér. 9, v, p. 191.

[19] Delor. *Thèse de Lyon.*

[20] Guisez et Stodel. *Compt. rend. de la Soc. de Biol.*, 1912, lxxii, p. 457.

[21] Rosenthal, G. "L'injection intratrachéale vraie" (Consult. méd. françaises), Poissat, éditeur.

[22] Berthelon. *Province méd.*, July 20, 1912.

[23] Balvay et Arcelin. Congrès pour l'Avancement des Sciences," Lille, August, 1909: *Soc. de méd. de Lyon*, November 20, 1911.

[24] Bossan, E. A., et Guieysse. *Compt. rend. Soc. de Biol.*, 22 février, 1919.

[25] Levene. "Bio-chemistry of the *Bacillus tuberculosis*," *Journ. of Med. Research*, 1904, xii, p. 256.

[26] Breslauer. "Die intravenöse methode des localen Behandlung entzündlichen Prozesse," *Centralbl. f. Chir.*, Leipz., 1918, xlv, p. 277.

DISCUSSION.

Dr. HALLIDAY SUTHERLAND: The interest of the paper, to which we have listened, is mostly a speculative interest, because the composition of the medicament, for which considerable claims have been made, has not been announced. It is claimed that the remedy is absorbed into diseased areas of the lung, but I am bound to say that the photographs passed round fail to demonstrate that assertion. In these photographs of sections of a tuberculous lung, we see irregular masses of an oily substance, stained black with osmic acid. Now if the medicament were absorbed, either by osmosis or by phagocytosis into the diseased tissues, it ought to be evenly distributed and finely subdivided. In reality it is not even within the pulmonary tissues, but lies within the lumen of these bronchi or bronchioles which are not occluded by disease. The same appearance could be reproduced by the intratracheal injection of any vegetable or animal oil or fat. It is also claimed that the remedy contains a portion of the waxy envelope of the tubercle bacillus in solution. If that be so, the preparation of this substance marks a most extraordinary advance in bacteriological chemistry. The exhaustive researches of Bullock proved the difficulty of finding a suitable solvent for the protective envelope of the tubercle bacilli. For my own part I have boiled tubercle bacilli for six weeks continuously in chloroform, without obtaining complete solution of the wax. On the other hand, we do know that tubercle bacilli can be grown in oil, and presumably the oil in which they are grown will contain some of the exotoxins. In an oily medium the bacilli revert to the streptothrix form, and possibly the composition of the exotoxins might also undergo alteration. If that be the nature of the medicament, as I speculate it may be, then the results could be explained without difficulty. The patient's nutrition would benefit by the absorption of a certain amount of a nutritive oil from the respiratory tract; and his resistance would be increased by a reaction to the tuberculin contained in the oil. I have used tuberculin for the past thirteen years, and I still hold it to be our most valuable adjunct to general treatment, when properly administered. That was also the view of Trudeau, and is to-day the opinion of those who have used tuberculin most extensively. So far as the medicament is concerned, all I have said is perforce sheer guessing, but if the guess be right then I think as good results could probably be obtained by giving cod liver oil by the mouth, and tuberculin subcutaneously. If it be an oil containing tuberculin, then intratracheal injection is a very crude method of judging dosage, as this would depend on the absorbing power of diseased tissue. Moreover, intratracheal injections, unless absolutely necessary, are not advisable, as they certainly do not add to the patient's comfort. In conclusion, may I ask Dr. Bossan, who comes from a school to which we are all indebted for much clinical inspiration, to forgive the critical nature of my remarks, which are of necessity, speculative, and may I also support the request from the chair that we might have more exact information about this very interesting therapeutic experiment.

Dr. BOSSAN (in reply): (1) The preparation of the vaccine is not a secret. It is common knowledge that waxes, fat substances and oils in combination are mutually dissolved. Professor Borrel stated in his paper, already quoted from, that the waxes of the tubercle bacillus are dissolved in oils and animal fats. This fact is easily proved by the loss of acid-fastness in the treated bacilli. To prepare the vaccine, place the bacilli in well sterilized castor oil or poppy oil or olive oil, and leave the emulsion thirty days in the incubator. Then filter it through a porcelain filter and the vaccine is ready for use. Great care must be taken to prevent the access of any source of contamination. (2) It is easy to see from the photographs that the masses

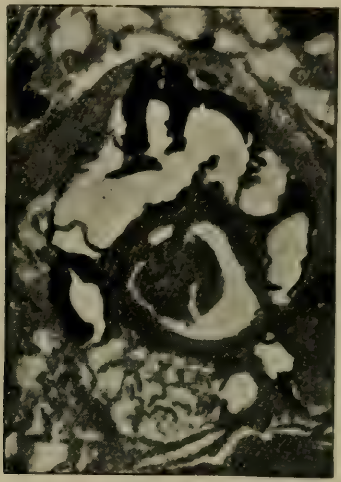

FIG. 1.

Small cavity twenty-four hours after injection. The walls are seen to be lined with the vaccine reduced by the osmic acid.

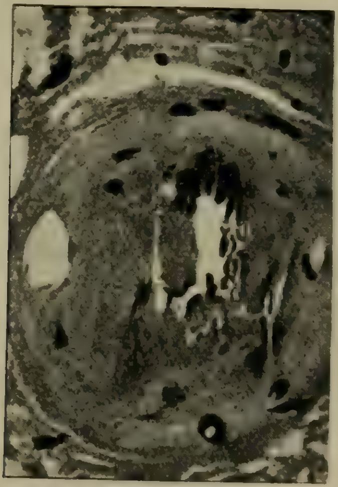

FIG. 2.

Tubercular nodule twenty-four hours after injection. The vaccine is seen to be reduced by the osmic acid which has penetrated into the nodule.

of oil are within the pulmonary tissues, some of them even in the epithelial cells. And this will be still better seen from the examination of preparations under the microscope. With the aid of my friend, Dr. Guieysse, I shall shortly be enabled to demonstrate to the Fellows microscopic preparations showing cells full of oily granulations. (3) The intratracheal injections are easily carried out and well tolerated by the patients. (4) I must again repeat that the administration of tuberculin alone is not sufficient, and that "in order to confer perfect immunity, or at least to combat the invasion by the bacillus successfully, we must immunize with the sum total of toxic substances contained both in the bacillus itself, in its waxy envelope and in the medium in which it lives."

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SUPPLEMENT

(Vol. XII, No. 1, November, 1918).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

The Systematic Treatment of Gonorrhœa. By N. P. L. Lumb, Temporary Captain R.A.M.C. Pp. viii + 119. Price 4s. 6d. net. London: H. K. Lewis and Co., Ltd., 1918.

In this book, which was inspired by the official campaign against venereal disease, the author describes in clear language the course, symptoms, pathology and bacteriology of gonorrhœa, and the routine examination necessary in every case of the disease. Concise details are then given of the various complications of gonorrhœa, and the treatment—routine and special (vaccine, electro-chemical, and by mercury compounds). The last chapter is devoted to the consideration of the gonorrhœa patient, his aspect of the disease, what precautions should be observed, and various other points, including the methods of examination which are necessary in order to ascertain when the patient can be pronounced cured.

Minor Maladies and their Treatment. By Leonard Williams, M.D. Fourth edition. Pp. xi + 402. Price 7s. 6d. net. London: Baillière, Tindall and Cox, 1918.

Under the present system of medical education the student has a natural tendency to concentrate his mind on those organic diseases which are likely to form the basis of examination questions. As a result, when he commences general practice he is apt to be disconcertingly ignorant of the proper treatment of the slighter ailments which will probably constitute the bulk of his daily work—hence the importance of books such as the one under review. In this, the fourth edition, the author has made considerable alterations. Among others, the section on Constipation has been entirely re-written, the chapter on Change of Air has been replaced by one on Minor Glandular Insufficiencies, and a short chapter on Old Age has been added. The author rightly believes that, by the study of the whole field of the internal secretions, we shall be able to detect and correct morbid tendencies far more successfully than we have been able to do by means of the older methods. The book treats of several points which are not usually emphasized in the larger text-books. It is written in conversational style, the type is clear, and there is a comprehensive index.

A Handbook on Antiseptics. By Henry Drysdale Dakin, D.Sc., F.I.C., F.R.S., and Edward Kellogg Dunham, M.D., Major M.O.R.C., U.S. Army. Pp. ix + 129. Price $1.25. New York: The Macmillan Co., 1917.

This handbook is intended for those who are concerned with the care of the wounded. It gives a concise account of the methods of preparation and use of various new antiseptics and modifications of old ones, which have been put to the test during the past four years of the war. Although the authors disclaim any endeavour "to make a complete compendium of the innumerable antiseptics and disinfectants that have been proposed from time to time," there are few antiseptics of any note which are not commented upon. In Chapter I are given a classification of antiseptics, the laws of disinfection, the influence of media, the choice of antiseptics, and the modes of application. In the last chapter certain special applications of antiseptics are described: the disinfection of carriers, the disinfection of water, and the disinfection of hospital ships, &c., with electrolytic hypochlorite.

Aids to Rational Therapeutics, with U.S.A. Pharmacopœia Equivalents. By Ralph Winnington Leftwich, M.D., C.M., M.R.C.S.Eng. Pp. x + 233. Price 3s. 6d. net. London: Baillière, Tindall and Cox, 1918.

In the usual handbooks on treatment, diseases are, for the purpose of therapeutical indications, either arranged alphabetically or according to the organ affected. In this book the author has grouped together, without regard to the organ affected, diseases requiring similar treatment, and diseases which are of allied pathology. On this double basis the author has divided diseases into forty groups; diseases which could not be so classified are dealt with separately. The treatment common to each particular group is given, and is supplemented by that treatment which is special to each member of the group where modification is required. There are chapters on convalescent treatment and on doses. In an appendix hints are given for students and for those newly qualified. The author is an enthusiastic advocate of mental labour-saving. He has grouped diseases and methods of treatment, and advocates the grouping of doses of drugs on a basis of uniformity. If he could achieve the latter object he would earn the gratitude of every hard-working practitioner. In the British Pharmacopœia there are only twenty-five liquors, but they have sixteen different doses!

Clinical Disorders of the Heart Beat: a Handbook for Practitioners and Students. By Thomas Lewis, M.D., D.Sc., F.R.C.P. Fourth edition. Pp. xii + 120. Price 6s. net. London: Shaw and Sons, 1918.

This edition follows the main lines of the three previous ones. It is compact and easier to read than the larger works by the same author. Stress is again rightly laid on the fact that recent knowledge of the heart and of its affections has been gathered largely by precise graphic methods which have reformed our conceptions of cardiology, and Dr. Lewis has incorporated the new information gathered from inquiry into the clinical histories of patients and as to bedside methods, together with relatively simple tests by which the common disorders of the heart may be recognized. The text has been revised and the graphic records confined almost to such as illustrate what may be seen and felt. Hence those in active practice can assess the value of subjective signs and symptoms on the part of their patients, in the light of the most modern laboratory methods: the results of which are ably condensed within the compass of this small volume.

Symptoms and their Interpretation. By Sir James Mackenzie, M.D., F.R.S., LL.D.Aberd. and Edin., F.R.C.P., F.R.C.P.I. Third edition. Pp. xx + 318. Price 8s. 6d. net. London: Shaw and Sons, 1918.

In addition to various emendations in the text, the third edition of Sir James Mackenzie's book on "Symptoms" includes two new appendices. One is intended to demonstrate what a great field of research lies ready to the hand of the surgeon, if he would use his opportunities; the other gives some suggestions, the outcome of the author's personal experience, as to research in medicine. It is pointed out that investigation of the meaning of subjective symptoms as a study of the earliest stages of disease offers a field for exploration unlimited in extent. The various editions of this book, which has been translated into other languages, afford indications that it is sought after by the growing number of those who strive after precision in clinical methods.

THE LIFE OF SOPHIA JEX-BLAKE. By MARGARET TODD, M.D. (Graham Travers). With four full page portraits; pp. xx + 574. Price 18s. net. London: Macmillan and Co., Ltd., 1918.

This is the life story, sympathetically told, of the "lion-hearted pioneer," by whose efforts and self-sacrifice the admission of women to the profession of medicine in this country was in the main made possible. Sophia Jex-Blake plunged into medical affairs by acting, quite suddenly, in 1866, as dispenser, general secretary, and "chaplain, with discretionary powers," to the hospital in Boston, U.S.A., whither she had gone on a tour of inspection of women's work. Here her friend, Dr. Lucy Sewall, was resident physician. She speedily found herself "getting desperately in love with medicine as a science and as an art." Blessed with natural gifts of persuasive oratory and an excellent memory, she shone as much upon public platforms as when presiding at her own dinner-table. That she also possessed no mean literary ability at this time is shown by the manner in which her book "A Visit to some American Schools and Colleges" was received. She was enrolled as a medical student and devoted herself to her medical pursuits, studying anatomy in New York under Dr. Elizabeth Blackwell. The death of her father compelled her to forego her prospects in America and to live with her mother in Brighton. But she was destined, henceforth, to seek out a means of medical education in this country. After having knocked in vain at the portals of the University of Cambridge, she set to work to beard the professors of the Medical Faculty at Edinburgh University. Her petition having passed this obstacle successfully in due course, she was bitterly disappointed to learn that the judgment had been reversed by the University Court. Unmoved by this decision she resolved to lodge a formal petition with the latter body for the admission of women to the study of medicine in separate classes. To the ultimate triumph of her cause the petition was granted and sanctioned by the Chancellor on November 12. 1869. Practical difficulties soon cropped up with regard to the mixed classes which were inaugurated later, and opposition on technical grounds became so considerable that it threatened to imperil the whole women's movement. The riot at Surgeon's Hall terminated in an action for libel brought against Miss Jex-Blake by Professor Christison's assistant, resulting in one farthing damage, but she had to pay in costs a bill of some £900. This sum was gladly subscribed by friends and sympathizers. Another blow, in the shape of the rescinding by the Senatus of the University of Edinburgh of the regulations for the admission of women to the University, would have discouraged any but the stoutest heart. Nothing baffled, we find Miss Jex-Blake instituting an Action of Declarator against the Senatus to define the position of women, which terminated in the famous judgement of Lord Gifford whereby the full rights of the women were vindicated, and the original enactment of the University Court was found to be valid and binding in every respect. Other worries crowded in upon her, not the least of which was the appeal of the University to the Inner House against the Gifford judgement, with the scarcely surprising result that she failed in her first professional examination! The battle was ended in Edinburgh by the reversal of the Gifford judgement on appeal in 1873. In the following year the Cowper-Temple Bill was introduced into Parliament "to remove doubts as to the powers of the Universities of Scotland to admit women as students, and to grant degrees to women," but the question was shelved for a while. The opening, on October 12, 1874, of the London School of Medicine for Women at 30, Handel Street, which she was instrumental in founding, marked a new epoch in the struggle. In 1876 the Russell Gurney Enabling Bill became law, and in the same year Miss Jex-Blake qualified as M.D. Berne, and was placed upon the *Register* through the portals of the Irish Colleges. Two years later the University of London admitted women to all its degrees, and the Royal Free Hospital was thrown open to women.

Miss Jex-Blake practised in Edinburgh for twenty-one years, and by adding a few beds to her Dispensary the nucleus of the Edinburgh Hospital for Women and Children was formed. It was a source of much gratification to her that, in 1885, the Conjoint Colleges of Edinburgh threw open their examinations to women, but it was not until 1894 that the University followed suit. In her years of retirement at Windydene, the Sussex Mecca for young medical women, Dr. Jex-Blake continued to exercise her ennobling influence upon all those with whom she was brought into contact. The end came suddenly, but peacefully, on January 7, 1912. A family pedigree and some letters to the *Times* are placed in appendices, and there are four portraits.

ÉTUDES SUR LE FONCTIONNEMENT RÉNAL DANS LES NÉPHRITES CHRONIQUES. Par PASTEUR VALLERY-RADOT. Pp. 256. Paris: Masson et Cie, 1918.

This volume deals with the results obtained in a clinical investigation of chronic nephritis carried on over a period of several years. The first chapter contains a full discussion of the new functional tests utilized in the study of renal disease. In general, the author comes to the conclusion that the majority of tests which depend on the elimination of foreign bodies are of little value, and concludes that it is necessary to use substances which occur normally in the body, such as urea. Phenolsulphone-phthalein, however, constitutes an exception, since, according to the author, it closely follows the course of urea elimination. A good deal of the volume is taken up with the problem of chloride retention in nephritis. The statement is made that the retarded elimination of chloride so often encountered in chronic renal disease is but an exaggerated manifestation of what obtains in the healthy individual. Normally, when excess of chloride is present in the organism, its elimination does not proceed regularly, but its excretion may be represented by an irregular curve of staircase form. This view is based on the results of many experiments on subjects with healthy kidneys. In testing chloride excretion stress is laid on the necessity for giving repeated doses of sodium chloride on successive days: the usual method of giving one large dose yields little real information. The retention and consequent concentration of nitrogenous bodies in the blood is fully dealt with. The opinion is expressed that, given certain conditions, the most valuable information as to prognosis may be obtained by estimation of the amount of urea present in the blood. If the urea content amounts to 100 mgr. per 100 c.c. blood the prognosis is bad, and death will almost certainly take place within two years; if the amount of urea exceeds this, the prognosis becomes correspondingly more grave. With lower values it is impossible to express a definite opinion, for in cases with from 50 to 100 mgr. the general condition may improve or remain stationary for years. Definite kidney inadequacy may be present without any increase in blood urea content, but in these cases information may be obtained by using Ambard's formula. The concluding chapters deal fully with the arterial and circulatory disturbances associated with Bright's disease. The book concludes with a short chapter on observations made on rabbits suffering from artificially produced renal lesions. There is a very full bibliography.

ELEMENTS OF FOLK PSYCHOLOGY: OUTLINES OF A PSYCHOLOGICAL HISTORY OF THE DEVELOPMENT OF MANKIND. By WILHELM WUNDT. Authorized Translation by EDWARD LEROY SCHAUB, Ph.D. Pp. xxiii + 532. Price 15s. net. London: George Allen and Unwin, Ltd., 1916.

In recent years the problems with which psychology deals have begun to take their natural place amongst the experimental sciences, and to all those interested in the neuroses and psychoses, with the development of the conception of psychological regression, the study of the behaviour, thoughts, ideas and religions of primitive races has become of great importance. It is now widely recognized that the principles of evolution are applicable both to material and immaterial or spiritual processes. In the book before us Wundt expounds some of the common types and forms through which human social development has passed in relatively historical times. The forms of the folk-mind, as they express themselves at any one instant of time, are here considered and portrayed in their reciprocal relations. Type-specimens are described, then the rules or laws of mental development are deduced from the inter-relations of these type-specimens. The aim of the book is synthetic rather than analytical. The book is divided into an introduction and four chapters. Chapter I deals with primitive man, and what men should be considered primitive; then in turn the expressions of the culture of the type, his marriage relations, his society, his language, his thinkings, his beliefs in magic and demons, his art, intellect and morals are described. In Chapter II the characteristics of man in the totemic stage are considered, and details are given of the various cults and tribal organizations which at this stage have made their appearance: then follow sub-chapters dealing with the origin of exogamy and its varieties, and with polygamy. Various theories concerning the origin of the totemic ideas and the laws of taboo are considered, and descriptions of the soul beliefs of the totemic age, with its fetishes and animal and human ancestor-worship, are given. This chapter ends with a discussion of the totemic cults and the art of man at this stage of his development. Chapter III is devoted to the age of heroes and gods, to the development of political society, the origin of cities, of legal systems, of ideas of a Godhead and the Hero Saga, and the correlated behaviour of mankind. In the final chapter the author discusses the development of concepts towards humanity with its world-empires, world-cultures, world-religions, and world-history.

The Hearts of Man. By R. M. Wilson, M.B. Pp. xx + 182. Price 6s. net. London: Henry Frowde, Hodder and Stoughton, 1918.

The purpose of this book, according to the author, is to discuss certain phenomena of the circulation and of the nervous system, such as the relationship of the pulse to the respiration, the mechanism of breathing in effort and at rest, and the meaning and effect upon the general circulation of the great "blood lakes" of the skin, abdomen, and lungs. He has formed the conception that there is a peristaltic wave in those arteries which join the blood lakes—i.e., the arterial tree connecting the heart with the skin and with the mesenteric blood lake. He has further arrived at the conclusion that there are not two hearts but five, for the blood lakes are propellers of the blood, and their activities are mutually interdependent. In the elaboration of his theory the author discusses the action of the muscular system and the effect of the secretions of the ductless glands on the circulation. The rôle of the vagus system and of the sympathetic nervous system is dwelt on. Many polygraph tracings of the respiratory movements and of the pulse are shown to illustrate the various theories propounded. The opinions of two distinguished critics of the book—namely, Sir James Mackenzie and Professor Bayliss—are included in the preface.

Life and Letters of Sir Joseph Dalton Hooker, O.M., G.C.S.I. Based on Materials collected and arranged by Lady Hooker. By Leonard Huxley. In two volumes. With portraits and illustrations; pp. xii + 546 and viii + 569. Price 36s. net. London: John Murray, 1918.

Sir Joseph Hooker's life, written by Professor Huxley's son, covers a most important era of scientific advance, and contains much of the correspondence between Hooker and Darwin. Hooker was Darwin's lifelong friend, and for fifteen years his sole confidant, and so the story of Hooker's life's work is, in one aspect, the history of the share taken by botany in establishing the theory of evolution and the effect produced upon it by the acceptation of that theory. Hooker had every opportunity and utilized each one to the utmost; like many distinguished men he was a second son; his father, Sir W. Hooker, was Professor of Botany at Glasgow, and afterwards Director of the Royal Gardens at Kew; and his maternal grandfather, Dawson Turner, was a distinguished botanist and a Fellow of the Royal Society. Thus growing up in the atmosphere of botany he was educated at Glasgow, where he took the M.D. degree in 1839, and after spending some months under Sir John Richardson at Haslar, he went as assistant surgeon and botanist in H.M.S. *Erebus*, under Captain Ross, in the Antarctic expedition of 1839-43, and was thus able to advise Captain Scott with regard to the voyage of the *Discovery* in 1901. In addition to botanical, he carried out valuable zoological researches. On his return home he began to bring out the "Antarctic Flora," and for a time lectured at Edinburgh as substitute for the dying professor of botany, but failed to obtain the chair. After refusing the corresponding chair at Glasgow, he returned to London and was soon appointed botanist to the Geological Survey, in order to work out the British flora, extant and fossil, in relation to geology. In 1847 he was elected a Fellow of the Royal Society, and went to India, visiting the Himalayas, with exciting experiences in Sikkim and Thibet; and after returning to England he married Frances Henslow, eldest daughter of the Cambridge Professor of Botany, and in 1855 became Assistant Director at Kew under his father, whom, ten years later, he succeeded as Director. In the meanwhile, though neither lecturing nor teaching in person, he examined in science for the medical services and other bodies for twelve years, and thereby had a useful educational lever in his hands. In setting questions, his object was to obtain answers requiring thought rather than memory; and he was convinced of the value of botany in medical education, not because it is of the slightest direct advantage in practice, but because such elementary knowledge is essential to a proper understanding of hygiene, the pharmacopœia, therapeutics and materia medica, and because the mental training of a good elementary botanical or natural history course is the best means of becoming skilful in diagnosis and of expanding the mind. Though brought up in the old school of a knowledge of plants, he fully appreciated the importance of physiological botany which took shape under the inspiration of his friend Huxley, and was taught by Sir Thiselton Dyer, his successor at Kew. The numerous letters to Darwin and Huxley, his friend of forty-two years, form an attractive feature in this life of the great botanist who died, full of honours, at the advanced age of 94 years in 1911. An appreciation of Sir Joseph Hooker's position as a botanist is contributed by Professor F. O. Bower.

LIPODYSTROPHIA PROGRESSIVA. By F. PARKES WEBER, M.A., M.D., F.R.C.P.Lond. With 7 illustrations; pp. 29. Price 1s. net. London: Adlard and Son and West Newman, Ltd., 1918.

This pamphlet, which is a reprint from the *Clinical Journal* of June, 1918, contains an account of four cases and a review of the literature. In spite of its title, the disease is not always progressive. It usually commences in childhood, especially at 6 to 8 years of age. In some cases the fat atrophy is preceded by increase of fat in the buttocks or legs. The disease is not, as was at first supposed, confined to the female sex. Genuine examples have been recorded among males, and probably some of the cases labelled "bilateral atrophy of the face" are examples of this condition. The ætiology is unknown, but is probably concerned with a disorder of the internal secretions. The condition, however disfiguring it may be, and though it may give rise to a suspicion of tuberculosis, is not dangerous to life, and is not usually accompanied by loss of strength or of general health.

A TEXT-BOOK OF RADIOLOGY (X-RAYS). By EDWARD REGINALD MORTON, M.D., C.M.Trin. Tor., F.R.C.S.Ed, Second edition. With 36 plates and 93 illustrations; pp. xvi +264. Price 10s. 6d. net. London: Henry Kimpton, 1918.

As is stated in the preface to the first edition, this text-book does not aim at being in any way comprehensive, but rather at forming a useful guide to those taking up radiology for the first time, and to take them along the first steps in the application of the X-rays to the investigation and treatment of disease. The fact that a second edition of the work was called for within twelve months of its first appearance shows that it has filled a niche in the literature of the subject. In this, the second edition, some parts have been revised, and some new illustrations and new matter have been added. Among the latter may be mentioned an instructive description of the X-ray appearances of some common disorders of the stomach—the substance of a paper read before the West London Medico-Chirurgical Society a few days after the publication of the first edition.

BABY WELFARE: A GUIDE TO ITS ACQUISITION AND MAINTENANCE. By W. E. ROBINSON, M.D., B.Ch., B.A.Oxon. Pp. xiv + 206. Price 7s. 6d. net. London: T. Fisher Unwin, Ltd., 1918.

The substance of lectures delivered by Dr. Robinson at the Infants' Hospital, Vincent Square, London, forms the basis of this work. The book sketches the "Healthy Infant," about whom little is written, and then deals with the anatomy and physiology of the body: the physical and chemical properties of milk, with a short chapter on its bacteriology. Feeding of the infant, naturally, occupies a great part of the book, and the modification of cow's milk, as practised in the out-patient department of the Infants' Hospital, is given in detail. The following are interesting chapters: "The Care of the Difficult Infant," "Toxæmias," "Rickets," "Scorbutus," and "The Care of Infants in Disease."

GYMNASTIC TREATMENT FOR JOINT AND MUSCLE DISABILITIES. By Brevet Colonel H. E. DEANE, R.A.M.C. With Preface by Temporary Colonel A. CARLESS, A.M.S., and by Brevet Lieutenant-Colonel F. W. MOTT, F.R.S., R.A.M.C.(T.). With 26 illustrations; pp. 146. Price 5s. net. London: Henry Frowde, Hodder and Stoughton, 1918.

The author gives his experience of the good results in cases of joint and muscle disabilities obtained in the War Hospital, Croydon, by simple gymnastic methods and inexpensive apparatus, such as Indian clubs, the vertical rope, the sparred plank, parallel bars, &c. Colonel Deane has studied his subject practically, and therefore knows the effect of every movement and each exercise from personal experience. This, without doubt, accounts for the success of his methods, the underlying principle of which is that the patient must do things himself, the "will-to-do" must be stimulated. "A fraction of movement obtained in that way," says the author, "is infinitely more valuable than any greater amount of movement obtained by passive methods." The book concludes with a mention of the kind of games which are a valuable adjuvant to the treatment by apparatus. These include the ordinary games such as skittles, bowls, croquet, &c., also two games—"cat and dog" and "twos and threes"—which, being reminiscent of childhood's days, will doubtless be played with avidity by the wounded sailor or soldier. There are two prefaces, by Colonel A. Carless and by Brevet Lieutenant-Colonel F. W. Mott respectively, both of whom have seen the results of the author's methods of treatment.

WAR NEUROSES. By JOHN T. MACCURDY, M.D., Psychiatric Institute, New York. With a Preface by W. H. R. RIVERS, M.D.Lond. Pp. xii + 132. Price 7s. 6d. net. Cambridge: The University Press, 1918.

This work is almost an exact reprint of an article published in the *Psychiatric Bulletin* in July, 1917, and is a record of the author's observations and study of cases of war neuroses among the British Expeditionary Force which he made when on a visit to this country for the purpose of gathering information on the subject which might be instructive to American medical officers. Though such physical factors as concussion and internal secretions are assigned their possible parts as causal agents, the ætiology of the war neuroses is shown by the author to be mainly, if not entirely, of a psychological nature. Except for a chapter devoted to a consideration of heart neuroses and one on the part concussion plays in the production of neurotic manifestations, the contents relate to the problems of the two hysterical forms—viz., "anxiety hysteria," most commonly seen in the officer, and "conversion hysteria," which is confined almost entirely to the private and non-commissioned officers. MacCurdy's point of view—now largely held by the more modern students of the subject—is that the physical shock, which was and is by some still considered to be the causal agent of war neuroses, is only the last straw in a series of factors producing the final breakdown, and that a careful anamnesis will unearth a history of more or less protracted mental conflict which is finally resolved by some accidental trauma, physical or psychical, into the now well-recognized clinical picture of a fully-developed neurosis. The main psychological factor involved is, he thinks, a failure of that sublimation which permitted a freeing of the aggressive instincts through herd influence, so that the soldier tends to become individualistic and to be appalled by the horrors of warfare, with the result that mental conflicts between self and duty are set up, and these are necessarily complicated with a desire to get away from the danger and horror of his environment. The private tends to long for a "Blighty" wound, while the officer is allured by a desire for death. Wishes, fully conscious to the subject, are found directly determining symptoms. Amidst the great strain of this modern warfare, a previous neuropathic history is by no means a necessary factor, though if present the chance of the development of a neurosis is much enhanced. The mental make-up of these patients is discussed in detail, and the chain of symptoms from early fatigue, depression, insomnia, &c., until the breakdown is complete, is fully described. Under the heading of "psychological considerations," all the psychic mechanisms in the production of the neurosis are explained, and a chapter on "prophylaxis" concludes the volume. As Dr. W. H. R. Rivers points out in his introductory preface, "Dr. MacCurdy was especially struck in the neuroses of war by their simplicity as compared with those of civil practice. He rightly ascribes this to the fact that the war neuroses depend essentially on the coming into play of the relatively simple instinct of self-preservation, while the neuroses of civil life largely hinge upon factors connected with the far more complicated set of instincts associated with sex." The book is pregnant with interest.

THE INFLUENCE OF JOY. (Mind and Health Series, edited by H. ADDINGTON BRUCE, A.M.) By GEORGE VAN NESS DEARBORN. Pp. xviii + 223. Price 5s. net. London: William Heinemann, 1916.

Of late years special investigations have been made regarding the influence of the emotions upon the organic functions. Foremost among the investigators in this domain is Pavlov, who has so brilliantly shown the influence of the emotions, for good and evil, on the digestive functions. Pavlov's example has been followed by other scientists in many countries, and the effects of the emotions on the heart, arteries and lungs, kidneys, liver, &c., have been carefully studied. The author of the present volume has made special investigation on the influence of joy on the bodily functions, and his object in writing it is to show the beneficial influence of joyful emotion on health.

A PLEA FOR THE INSANE: THE CASE FOR REFORM IN THE CARE AND TREATMENT OF MENTAL DISEASES. By L. A. WEATHERLY, M.D. Pp. 238. Price 10s. 6d. net. London: Grant Richards, Ltd., 1918.

Dr. Weatherly presents the case for reform in the care and treatment of mental diseases in a most direct and forcible manner. In his criticism of the Lunacy Act, based upon long experience of its inadequacy to meet present-day requirements, and the too often injurious effects of its provisions on those whom it is formed to protect, and illustrated by numerous examples, he will have the support of the great majority of the profession, and not least from those who for years have been struggling against impossible conditions existing in many of the great institutions for the insane. He has summarized most of the opinions of individuals and societies expressed during the last quarter century, and he presents the case for reform in a way no reader can fail to understand. It is addressed equally to the general public, and should be widely read, especially by the members of municipal and governing bodies who are responsible for asylums and mental hospitals; but it is the former whom the author rightly blames for an inexplicable complacency towards the existing state of things. Dr. Weatherly is fearless and unsparing in his criticism of the weakness of the provisions for dealing with mental disease in this country, which compares so unfavourably with many others. The author comments on the absence of careful clinical investigation into each individual case, which asylum routine and the administration of the Lunacy Act, no less than the inadequately small medical staffs, renders impossible, to the detriment of the recovery-rate. The case for voluntary boarders at County and Borough Asylums, for clinics and approved homes is discussed, besides many other aspects of the question. There is also an instructive chapter on criminal responsibility. The author supports his arguments by many quotations of weighty opinions of well-known authorities; amongst others, Sir Frederick Needham, present senior member of the Board of Control, and Sir Thomas Clifford Allbutt, a late Commissioner in Lunacy, from which it appears that the Board of Control is as little sympathetic with many of the provisions of the Lunacy Act as it is powerless to remedy them. In the last resort it is to the public he appeals. He says, in effect—if you want adequate care and treatment for your mentally afflicted, borderline and insane, you must agitate for it, and be willing to pay for it. Alienists themselves have been agitating in vain for years. When disorder of mind comes to be regarded intelligently by a discerning and educated public opinion, and when venereal disease can be treated by notification and prophylactically, as in the case of small-pox and scarlet fever, much of the difficulty will have been overcome.

AN INDEX OF PROGNOSIS AND END-RESULTS OF TREATMENT. By VARIOUS WRITERS. Edited by A. RENDLE SHORT, M.D., B.S., B.Sc.Lond., F.R.C.S.Eng. Second edition. Pp. xi + 770. Price 30s. net. Bristol: John Wright and Sons, Ltd., 1918.

This volume is a companion to the Index of Treatment and Index of Differential Diagnosis brought out by the same publishers. Its principal aims, as described in the preface to the first edition, are to set out the end-results of different methods of treatment, and, apart from that, to furnish data for prognosis in the individual case. The present edition has been extensively revised and a number of new articles have been added, amongst these being articles on tetanus, gas gangrene, septic peritonitis, and gunshot wounds. The book is edited by a surgeon (Mr. Rendle Short) and a relatively large amount of space is devoted to surgical subjects and the results of operative treatment. The articles are arranged in alphabetical order, and there is a copious supplementary index.

MODERN UROLOGY. In Original Contributions by American Authors, edited by HUGH CABOT, M.D., F.A.C.S. In Two Volumes. Vol. I: General Considerations—Diseases of Penis and Urethra—Diseases of Scrotum and Testicle—Diseases of Prostate and Seminal Vessels. Vol. II: Diseases of Bladder—Diseases of Ureter—Diseases of Kidney. With 632 engravings and 17 plates; pp. xiii + 744 and viii + 708. Price $14.00. Philadelphia and New York: Lea and Febiger, 1918.

These two volumes comprise a series of articles by twenty-nine American surgeons specializing in genito-urinary diseases. Volume I opens with an historical sketch of genito-urinary surgery in America, by F. S. Watson, which includes brief sketches of some of the more notable men in the field of urology, traces the evolution of urology in America, and describes the contributions of American surgeons to the subject. Leo Buerger contributes a chapter on the cystoscope and its use, and there are chapters on the methods of diagnosis and X-ray examination written by Bransford, Lewis and Dodd respectively. Syphilis of the genito-urinary organs is discussed by Corbus, who has also contributed a chapter on genital ulcers. The anatomy, anomalies and injuries of the penis are discussed shortly by H. A. Fowler, and Warren devotes a few pages to diseases of the penis. Forty-nine pages are allotted to infection of the urethra and prostate, the article being written by Barringer, while Osgood describes the diseases of the urethra in the female in a similar number of pages. Stricture of the urethra is separately considered by E. L. Keyes, jun. There is a section on disease of the scrotum and testicle, which includes articles by George Gilbert Smith, A. Raymond Stevens, J. Dellinger Barney, and Edwin Beer. The anatomy of the prostate is described by Quinby, and Pilcher has a long article on prostatic obstruction. Young devotes a chapter to cancer of the prostate, and another to sarcoma of the prostate. The second volume comprises a section on the bladder, another on the ureter, and a third on the kidney. Kretschmer is responsible for the anatomy and physiology of the bladder, Lower for diverticulum, and Hagner for injuries of that organ. Caulk has an article of considerable length on infections of the bladder. Stone in the bladder and the different methods of treatment are fully discussed by

Cabot, who also contributes the chapter on stone in the kidney in Section III. Tumours of the bladder are described by Geraghty, and a full description of the tests of the renal function is given by the same author in the kidney section. The section on the ureter occupies sixty-six pages, and is written by Hunner. In the kidney section, in addition to those already mentioned, there are articles on anatomy and physiology by Quinby; hydronephrosis, moveable kidney and injuries by Squire; bilharziosis and echinococcus, by Edward L. Young, jun.; tuberculosis, by O'Neil; and tumours, by Binney. The volumes are profusely illustrated by photographs, drawings, and coloured plates, and some of the articles possess a bibliography.

VACCINES AND SERA: THEIR CLINICAL VALUE IN MILITARY AND CIVILIAN PRACTICE. By A. GEOFFREY SHERA, B.A., M.D., B.C.Cantab., Hon. Captain R.A.M.C. With an Introduction by Sir CLIFFORD ALLBUTT, K.C.B., M.D., F.R.S. Pp. xxi + 226. Price 7s. 6d. net. London: Henry Frowde and Hodder and Stoughton, 1918.

In the short space of some two hundred pages, Captain Shera gives briefly the results of his experiences in vaccine and serum therapy in military hospitals. The book is divided into four sections dealing respectively with (1) vaccines, (2) sera, (3) specific therapy, and (4) miscellaneous matters, such as auto-serum and normal serum therapy. The section dealing with vaccines is the largest. Here the author adopts the method of treating each vaccine under a disease group—e.g., diseases of the genito-urinary tract, diseases of infected gunshot wounds, diseases of respiration, &c. The section closes with a short chapter on tuberculin, in which it is concluded "that the therapeutic use of tuberculins is neither justified by use nor does the experimental evidence on which it is based bear repetition." The second section of the book deals with the filterable viruses, cerebro-spinal meningitis, tetanus, diphtheria, and anthrax. Sections three and four are very short, and treat only of certain aspects of specific therapy, such as salvarsanized auto-serums, transfusion, &c. The book is completed by a glossary and a tabular classification of vaccines and sera arranged from the standpoints of both prophylaxis and curative treatment.

BLOOD TRANSFUSION, HÆMORRHAGE, AND THE ANÆMIAS. By BERTRAM M. BERNHEIM, A.B., M.D., F.A.C.S. With 18 illustrations; pp. xix + 259. Price 18s. net. Philadelphia and London: J. B. Lippincott Co., 1917.

This is an expansion of the chapter devoted to the subject in the author's earlier work on the surgery of the vascular system. After an introductory historical note, preliminary chapters are devoted to the phenomena of bleeding, the control of hæmorrhage, and the diagnosis of blood loss. Indications for transfusion are tabulated, including not only primary anæmia but even the less-promising secondary forms. Dangers are discussed, but dismissed with a caution that takes the form of an appendix on the technique of agglutination tests. "Methods" are covered in about sixty pages, and though direct plans are fully described, the "citration" system and a modification of the Kimpton instrument appeal most kindly to the author. The rest of the book gives the writer's experience of transfusion for acute hæmorrhage, for simple and pernicious anæmia, for hæmorrhagic diseases, for leukæmia and splenic anæmia. There is a bibliography and an index.

DR. JOHN RADCLIFFE; A SKETCH OF HIS LIFE, WITH AN ACCOUNT OF HIS FELLOWS AND FOUNDATIONS. By J. B. NIAS, M.D., M.R.C.P., Radcliffe Travelling Fellow, 1882-85. With 13 plates; pp. 147. Price 12s. 6d. Oxford: The Clarendon Press, 1918.

The present work has been published in commemoration of the bicentenary of Radcliffe's death by Dr. Nias, who for many years has been collecting biographical data about his predecessors in the Radcliffe Travelling Fellowship. The sketch of Radcliffe's life contains an account of his career at Oxford and in London, and of his friendship with Mead, who probably gave him much help in settling the details of the Radcliffe Travelling Fellowships. Dr. Nias is of opinion that these appointments were originally intended to benefit the

University directly by improving the raw material for appointments to University professorships, and not by any means to be the endowments for the benefit of the medical profession, which they have since become. Biographical notices of the Radcliffe Fellows are given in chronological order from 1715, when the first two fellows were elected, until the present time, with the exception of Fellows still alive, in whose case merely a note as to their present professional position is given. The history of the Radcliffe Foundations contains contributions by Dr. Hatchett Jackson on the Radcliffe Library, by Dr. Rambaut on the Radcliffe Observatory, and by Dr. Macan, Master of University College, on Radcliffe and University College.

ORGANISM AND ENVIRONMENT AS ILLUSTRATED BY THE PHYSIOLOGY OF BREATHING (Silliman Memorial Lecture). By JOHN SCOTT HALDANE, M.D., LL.D., F.R.S. Pp. xi + 138. Price $1.25. New Haven: Yale University Press; London: Humphrey Milford, 1917.

In this volume are included four of the Silliman Lectures for 1915, delivered at Yale University by Dr. J. S. Haldane. They are as follows: (I) The Regulation of Breathing. (II) The Readjustments of Regulation in Acclimatization and Disease. (III) Regulation of the Environment, Internal and External. (IV) Organic Regulation as the Essence of Life. Inadequacy of Mechanistic and Vitalistic Conceptions. The conflict between the mechanistic and vitalistic schools is viewed from a new angle and will thus appeal to the general biologist and philosopher. For physiologists and physicians the book has an even more direct and practical value, the recent important discoveries regarding the regulation of breathing, the reaction of the blood and the phenomena of acidosis being briefly described in simple and clear language.

MILITARY MEDICAL MANUALS. General Editor: Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P. WAR OTITIS AND WAR DEAFNESS: DIAGNOSIS—TREATMENT—MEDICAL REPORTS. By H. BOURGEOIS and M. SOURDILLE. Preface by Médecin-Inspecteur JOUBERT. English Translation edited by J. DUNDAS GRANT, M.D., F.R.C.S. With 31 illustrations and 6 plates; pp. xviii + 231. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

The publishers of this series have done good service to those who have to deal with war medicine and surgery and aurists have especially to thank them for this volume dealing with military aspects of aural surgery. Drs. Bourgeois and Sourdille's work on war otitis and war deafness is characterized by the minuteness of detail and the studious lucidity of French writers, while the accuracy of the translation is vouched for by the English editor, Dr. Dundas Grant. The earlier chapters deal with the diseases of the ear as affected by the circumstances of war. A modified radical mastoid operation is described in some detail, supplying many hints for the military surgeon, whether at the Front or at the Base. The traumatic lesions are more in the picture, and their consideration is very complete. They are described as they occur in the various regions—auricle, tympanum, mastoid region, neighbouring parts of the skull more or less remote and the intracranial structures as they are related to the hearing and equilibrial functions. The various tests for hearing are detailed and compared and the relatively few "bed-rock" tests are discussed not only in the light of academical refinement, but also in that of common-sense and special experience. Many difficulties in the diagnosis of organic, functional, perpetuated, exaggerated and simulated deafness are simplified and to a great extent cleared up. The examination of recruits and conditions of fitness for service, as well as the preparation of reports on the disabilities leading to discharge and pensions or gratuities are very fully explained, in so far as they concern the hearing functions. The later chapters are those which will appeal most particularly to those who have to deal with troops, as, in view of the enormous incidence of disease and injury of the ears and various disturbances of hearing in this war, questions in connexion with them are constantly arising. Answers to most of them will be found in this work.

RADIOGRAPHY AND RADIO-THERAPEUTICS. By ROBERT KNOX, M.D.Ed., M.R.C.S.Eng., L.R.C.P.Lond. Second edition, in two volumes. Vol. I: Radiography, with 78 plates and 338 other illustrations; pp. xxv + 384 + xx. Price 30s. net. Vol. II: Radiotherapeutics, with 15 plates and 100 other illustrations; pp. x + 222. Price 15s. net. London: A. and C. Black, Ltd., 1917-18.

The first volume, dealing with radiography and diagnosis, has been considerably enlarged and thoroughly revised. It deals with the whole subject from a full consideration of sources of energy and appliances and their application in every class of diagnostic work to which the X-rays are applicable. Separate chapters are devoted to such subjects as localization of foreign bodies, the development of the bones, diseases of bones and joints, and their differential diagnosis, and the examination of the principal systems of the body, thorax, abdomen and pelvis. The illustrations are both clear and numerous, those of normal parts being so complete as to take the place of an X-ray atlas. The radiography of the skull is a branch that receives special attention, and here, as in many other parts of the work, the influence of experience with cases arising out of the War shows itself unmistakably. The volume closes with a chapter on congenital malformations and the usual glossary, bibliography and index. Volume II is devoted to the consideration of the therapeutic applications of the X-rays and radium singly and combined. The changes in normal and diseased tissues under radiation are dealt with at length and illustrated with microscopic slides. Numerous cases are illustrated, both before and after treatment. Methods of measuring dosage, the use of filters, and appliances for treatment of special areas, are fully explained; those referring to the application of radium being specially complete. A chapter on the physics of radium is contributed by C. E. S. Phillips, F.R.S.E., and others deal with the application of radiations to injuries and diseases met with in military practice, and plastic surgery of the face and jaws, the last being specially contributed by Mr. Percival P. Cole.

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XII, No. 2, December, 1918).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

Pathologie de Guerre du Larynx et de la Trachée. Par E. J. Moure, G. Liébault et G. Canuyt. With 8 coloured plates and 128 other illustrations; pp. 370. Price 25 fr. Paris, Félix Alcan, 1918.

This is a detailed description of the various lesions of the larynx and trachea resulting from the War. The first chapter is devoted to pure functional lesions, mutism, aphonia and stammering resulting from shock caused by the bursting of large shells near the victim. The symptoms, signs and treatment of these lesions are described in detail, and it is pointed out that the respiratory capacity of *mutilés* is always deficient and that the prognosis depends on the amount. It is claimed that with proper treatment a genuine aphonic ought to recover his voice and that those who are cured can and ought to return to active service. The second chapter treats of extralaryngeal lesions—namely, the injuries of nerves and neighbouring organs, such as the œsophagus, pharynx, &c. The anatomy of the laryngeal, glossopharyngeal, vagus, spinal accessory and hypoglossal nerves is discussed and the various disorders which result from their paralysis both individually and in combination. The third chapter deals with the injuries of the larynx and trachea themselves: the dangers such as hæmorrhage, asphyxia, emphysema; the causes of sudden death; the complications that supervene, more especially the different forms of stenosis which result. Treatment is very fully discussed and the value of X-rays and bronchoscopy are emphasized. A short account of the lesions resulting from "gassing" is also included. In the last chapter, which comprises more than half the book, the technique of the various operations is minutely described. General anæsthetics are deprecated as a rule. "High" tracheotomy is preferred to the "low" operation; the trachea should always be incised "sous le contrôle de la vue"; to prevent blood entering the air-passages the tracheal opening should be as small as possible. The methods of performing the thyrotomy are discussed and preference is given to the "procédé de Moure" which, shortly stated, consists of local anæsthesia, absence of tracheotomy, immediate and complete suture, the patient leaving the operating table breathing through the normal passages. Lastly there is the treatment of traumatic stenosis of the larynx, which occupies perhaps the most important part of the book. Moure is very strongly opposed to all forms of internal dilatation and argues strongly in favour of tracheo-laryngostomy. His method consists in complete division of the stricture by laying it open freely from the front so as to restore the normal calibre of the air-way. The new channel so formed is then preserved by insertion into the wound of a roll of gauze (pansement en cigare) which is fixed above a tracheotomy tube, the packing being changed every three or four days and replaced by a vulcanite cannula after two months, when the wound is lined with epidermis. The second stage consists in removing the tracheotomy tube and cannula and inserting a vulcanite tube into the air passage, the ends of which project above and below the limits of the wound for several months. Thirdly, the tube is removed, and lastly after several weeks or months, the fistula is closed by plastic flaps. Moure has treated twenty-four "canulards" by this method with eight complete cures, and sixteen of his patients are on the road to recovery. As he says, the great majority of tracheotomized patients can and ought to be cured.

RURAL WATER SUPPLIES AND THEIR PURIFICATION. By ALEXANDER CRUIKSHANK HOUSTON, M.B., D.Sc., F.R.S.Ed. Illustrated; pp. xv + 136. Price 7s. 6d. net. London: John Bale, Sons and Danielsson, Ltd., 1918.

This is another book by the Director of Water Examination, Metropolitan Water Board, and is written for the expert and non-expert reader who is interested in the problem of a safe water supply in rural districts, many of which are served by water supplies not under the direct control of a public authority. The first part of the book is devoted to rain water as a source of supply, and its purification; two chapters to well waters, springs, brooks, river and lake waters. The methods of sterilization and purification of these waters are dealt with in detail. Two further chapters give the results of actual experiments, and, lastly, a description of apparatus required is given. At the commencement of each chapter there is a summary of the matters discussed, and the conclusions arrived at are stated succinctly at the close. The book should prove of great value to those who are interested in the subject (and of rural dwellers who is not?), particularly from the offer of the author, Sir A. C. Houston, to explain any difficulty to a reader who cares to communicate with him.

JAMES HINTON: A SKETCH. By Mrs. HAVELOCK ELLIS. With a Preface by HAVELOCK ELLIS, and 8 full-page illustrations; pp. xxviii + 283. Price 10s. 6d. net. London: Stanley Paul and Co., 1918.

The author has endeavoured to sketch the lifework of "one of the most remarkable men in our profession," as the late Sir Samuel Wilks once wrote of James Hinton. Born at Reading in 1822, the third child of John Howard Hinton, M.A., a Baptist minister, he qualified in 1847, and five years later he set up as a specialist in aural surgery in London. As Mr. George Peard said of him, "his heart was not in the work he had to do as a professional man, but in the work he never had time to do; his desire for human welfare exceeded in its intensity the sum of all his other desires." He soon began to write on biological subjects, and after the publication of his "Life in Nature," he earned the praise of Thackeray, who remarked: "Whatever else this man can do, he can write." In 1863 he was appointed aural surgeon to Guy's Hospital, the post being specially created for him, and he settled in practice in 18, Savile Row. Intimacy with James Hinton deepened the belief in his greatness. This was the testimony of those who knew him well and in his most trying moods. He always insisted on right motives for all actions, and he preached the doctrine that our own goodness should never be allowed to stand in the way of our doing good. His moral writings occupied four large volumes. He saw the necessity that exists for all of us to "understand the art of ceasing to make innocent things wrong." Hinton's views on sexual matters were somewhat iconoclastic. He maintained that passionate desire should make the body an instrument wherein the soul can express itself and be incapable of anything else. The cure of prostitution is to be found in a great woman-sacrifice, nothing else or less. It is to women that he looks as a saviour of women. We are too accustomed to treat our sexuality as if it were the devil instead of the angel of our lives. The chief evil in our modern life lies in our incapacity to realize that the sexual passion, frightful as it is as a ruler, is sacred as a servant. The ideal relations of the sexes must be according to use, or service, as well as pleasure, and according to reason and love with no self in them at all at the basis. His attitude to women, whom he worshipped, was characteristic. He realized, as few men have ever done, the inner tragedies of women's lives, and this gave Hinton's work its value with regard to women's problems. Speaking of marriage, he declares that even in its ideal form, it is not always complete in its beauty and usefulness. The marriage of the future will combine, not only pleasure and the production of children, but will have for its main object work for the world. "Women are heroes," he cries, "and they should be treated as such." His gospel is that man's needs ought never to mean woman's sacrifice, but the needs of woman should alone constitute man's pleasure. His ideas respecting monogamy and polygamy are in many senses revolutionary, but they provide much food for serious reflection. "It should be possible," he declares, "for a woman to devote her life to a work, and yet to have a husband. This would be placing her on a par with men. It must be a depressing influence for women to know that, if they marry, they must be absorbed in housework; that is, they are being used up for the man." From the point of view of a lover, a doctor and a redeemer, he probed into the evils with which, as yet, neither religion nor legislation seem able to cope. Hinton was a true seer in that he was one of the first to recognize that woman's need is man's opportunity, instead of man's need demanding her sacrifice. His views on "The Mystery of Pleasure and Pain," and on "Art and Morals," are typical of his teaching. He died in 1875 in a hospital at St. Michael's, in the Azores, of a cerebral tumour. There is a full index and several photographs.

SURGERY IN WAR. By ALFRED J. HULL, F.R.C.S., Lieutenant-Colonel R.A.M.C. With a Preface by Lieutenant-General T. H. J. C. GOODWIN, C.B., C.M.G., D.S.O., Director-General, A.M.S. Second edition. With 210 illustrations; pp. xv + 624. Price 25s. net. London: J. and A. Churchill, 1918.

This is the second edition of the work, which contains a full account of its subject—surgery in war—whilst it presupposes a knowledge of surgery in general. It is profusely illustrated both by reproduction of photographs and by coloured illustrations. There is a full index. The Director-General, Lieutenant-General Goodwin, has written the preface, in which he notes a more detailed description of the primary treatment of wounds by excision and suture, as well as concerning shock and trench feet. Colonel Hull has been assisted by: Colonel E. M. Pilcher, who contributes the introduction; Captain W. Miller, a chapter on gunshot wounds of the chest; Dr. C. H. Browning, that on tetanus; Captain A. A. W. Petrie, on wound infection and anaërobic infection; Colonel Owen W. Richards, on wounds of the abdomen; Major Jocelyn Swan, on gunshot injuries of peripheral nerves, and on the later treatment of bone injuries; and Captain H. E. H. Tracy, on gunshot wounds of the jaw and face. The work commences with the bacteriology of gunshot wounds, followed by the various methods of treatment; next comes the removal of foreign bodies, aided by radiographical localization; then chapters on tetanus, on anaërobic infection, and on gas gangrene. Then follow chapters on special regional surgery, gunshot wounds of the head, spine and blood-vessels, with separate chapters on hæmorrhage and transfusion of blood; gunshot wounds of joints, of the abdomen, of the chest, of the peripheral nerves, of the limbs in general, and amputation of the jaw and face; on compound fractures, shock, and trench feet. A final chapter of some forty pages on the later treatment of gunshot injuries of bone, deals with questions which will be of continued interest for many years.

WAR SURGERY OF THE ABDOMEN. By CUTHBERT WALLACE, C.M.G., F.R.C.S.Eng., M.B., B.S.Lond. With 26 illustrations; pp. viii + 152. Price 10s. 6d net. London: J. and A. Churchill, 1918.

To quote the author in his preface: "This book contains the experience in abdominal surgery of a sector of the battle line over a period of thirty months. It is founded on the practice of many surgeons, working under different conditions and in different hospitals. The personal equation and influence of locality have thus been largely eliminated. It is hoped that the figures quoted may present a standard with which other surgeons may compare their results." The figures quoted will certainly do this, but the book is very much more than an array of figures; it is full of interest and rich with information. "In South Africa we learnt to treat many wounds with little respect. Wounds were allowed to scab over, and did remarkably well. Many surgeons were convinced that rest, starvation and morphia were the right treatment of abdominal wounds. This war, fought on infected soil, has proved that dirty wounds must be cleaned. It has also shown that penetrating abdominal wounds should be explored." The collection and evacuation of the wounded to the regimental aid posts, the advanced dressing stations, and so to the casualty clearing station or advanced operating centre is then described, and a tribute is paid to the magnificent work of the regimental medical officer and his stretcher bearers. A general review of abdominal wounds follows, in which amongst others the following points are dealt with : The relative frequency of abdominal wounds, the nature of the projectiles, the relative mortality of the different projectiles, the influence of the position and the direction of wounds as affecting prognosis, and the comparative frequency of wounds in the different viscera. A table is given showing the effect on the mortality-rate produced by the time which has elapsed between the receipt of the wound and the operation, from which it is seen that up to six hours the chances are in favour of the patient, and after that period are always against him. It follows from this that the sooner a man is operated upon the better, provided he can be kept quiet and well nursed, so that the casualty clearing station if reasonably far forward (from 10,000 to 15,000 yards from the line) is the best place for the operation. The mobile operating van is considered, and rejected as impracticable. The diagnosis of penetration of the peritoneal cavity is then considered. "It may be said that the wound of a hollow viscus has in itself no symptoms ; it is hæmorrhage or peritonitis which gives the danger signal." "Experience has shown that one has to be very careful in making a negative diagnosis, and it has also shown the wisdom of operating in doubtful cases." The next fifty pages are devoted to wounds of particular organs : their diagnosis, treatment and prognosis. Many interesting cases are quoted to illustrate the conditions found at operation. A chapter is devoted to abdomino-thoracic wounds and diaphragmatic herniæ, and this is followed by a chapter on the "causes of failure."

THE STATICS OF THE FEMALE PELVIC VISCERA. By R. H. PARAMORE, M.D.Lond., F.R.C.S.Eng. Volume I, with 26 illustrations ; pp. xviii + 383. Price 18s. net. London : H. K. Lewis and Co., Ltd., 1918.

In fourteen chapters and 354 pages the author has exhaustively completed his subject from the academic standpoint he has adopted. The acceptable accomplishment of his aim has been attained by study, research, experiment, resource, judgment and compilation, reminding the reader of the similar, subtle and serious, studies of John Hunter. It is a laborious method, in which the sieve is used with effect and discrimination. What are the materials ? They are revivals, opinions and efforts concerning the constituents of the pelvic floor. A connexion of first importance ought to be recalled. The pioneer movement was established in 1884 by Dr. David Berry Hart in his "Atlas of Female Pelvic Anatomy" ; his description of the pelvic floor as a whole, and of its behaviour under various influences, including the genu-pectoral position, has been followed by discussion betraying interminable ingenuity, restlessness, and rivalry. During the summer of 1907, the author of this volume was attracted to the subject, now so deservedly his own. He is the sponsor for the musculature : he has written often upon it : he has done justice to the muscles and their tendinous fasciæ : he liberally discusses the connective tissues : he is generally sceptical as to ligamentary and other hangings or supports of the uterus. Details, otherwise wearisome, have been laboriously investigated in chapter after chapter, terminating with the sufficiency of the pelvic floor. Surgery—abdominal and pelvic not excepted—has banished in abundance old views and absurd teachings, and has established realities where superstitions had lagged behind. When the pelvic floor is more conveniently and rightly regarded as the perinæum and as the continuation of the anterior abdominal wall, conservative and operative surgery will look back on the enduring merit of the original lead of Dr. David Berry Hart and on the selective achievements of Dr. R. H. Paramore in the elaboration and adjustment of details. This glaring need Dr. R. H. Paramore, by his text, illustrations and bibliography, has fulfilled in a highly creditable manner. The volume is a most welcome and permanent addition to the special literature.

A Text-book of Pharmocology and Therapeutics, or the Action of Drugs in Health and Disease. By Arthur R. Cushny, M.A., M.D., LL.D., F.R.S. Seventh edition. With 71 illustrations; pp. viii + 712. Price 18s. net. London: J. and A. Churchill, 1918.

Professor Cushny's text-book is already too well known to need detailed notice. The present volume marks the seventh edition of this useful work, and the opportunity has been taken thoroughly to revise the whole of it and to bring it up to date. The issue of the ninth revision of the United States Pharmacopœia has made it necessary to review the description of many drugs. The section on disinfectants has been revised in the light of war experiences; the treatment of dysentery with the ipecacuanha alkaloids has now been firmly established; a reconciliation of clinical and experimental results with digitalis is attempted, and the action of certain of the opium alkaloids has been further developed. The general arrangement of the book into an introduction and four parts is maintained. Part I deals with substances characterized chiefly by their local action; Part II with substances characterized chiefly by action after absorption; Part III with the heavier metals; Part IV with cod-liver oil, hypophosphites and glycerophosphates, together with various mechanical remedies; whilst a classification of drugs according to their therapeutic uses, and a clear index, complete the book.

War Wounds of the Lung: Notes on their Surgical Treatment at the Front. By Pierre Duval. Authorized English translation. With 27 plates and illustrations; pp. viii + 99. Price 8s. 6d. net. Bristol: John Wright and Sons, Ltd., 1918.

Duval rightly contends that the practice which obtained for rather more than the first two years of the war of treating wounds of the chest on lines different from those of other parts of the body has no logical basis. That this is true is now universally recognized, and to no one is greater credit due for the elucidation of this fact than to Duval himself. Deaths from chest wounds are due to causes which produce the same results in other wounds, and which in relation to their ill-effects on other wounded tissues have for some time been appreciated and overcome—viz., hæmorrhage and infection. Duval advocates more general and earlier operative interference with the object of dealing with the hæmorrhage directly, and of preventing infection by excision of the damaged tissues and removal of foreign bodies. From the purely surgical standpoint the argument is most convincingly presented, and its validity must be admitted; but the practicability of routine early operation on chest cases in fully equipped surgical centres near the line on an active front hinges so much on military considerations, transport, &c., that such questions cannot be decided solely on surgical grounds.

Studies in Forensic Psychiatry. By Bernard Glueck, M.D. From the Criminal Department, Government Hospital for the Insane (U.S.A.). Pp. viii + 269. Price 10s. 6d. net. London: William Heinemann, 1916.

This is one of a series of monograph supplements to the *Journal of Criminal Law and Criminology*, the publication of which is authorized by the American Institute of Criminal Law and Criminology. In a series of papers, rather than in a connected survey, the author has endeavoured to apply the recent methods of psycho-pathology to an intensive study of the criminal classes. In the first paper on psychogenesis, the author points out that the psychoses of criminals can be established far more clearly in prisoners awaiting a trial than in those already in jail, since the deleterious effect of confinement on physical health can be eliminated. He brings forward reasons for believing that the important ætiological factor in a large number of cases is the emotional shock which the commission of crime and its attendant consequences provoke. He supports his view by detailed accounts of conditions, such as stupor, amnesia, headaches, delusions, &c., which develop after the commission of offence, in prisoners apparently normal during their previous life. The next paper, on the psychoses of prisoners, carries this theme further, and contains a strong plea for the establishment of a psychiatric department in prisons for the special treatment of these cases. A chapter on litigious paranoia gives an account of two persistent litigants who, after bringing numerous actions against their supposed persecutors, were finally recognized as insane when charged with criminal offences. Both cases illustrate the need for closer co-operation between the lawyer and the physician in the administration of the law. The final chapters in this book deal with malingering and kleptomania.

DISEASES OF THE HEART AND AORTA. By ARTHUR DOUGLASS HIRSCHFELDER, M.D. With an Introductory Note by LEWELLYS F. BARKER, M.D., LL.D. Third edition. With 20 plates and 325 illustrations by the author; pp. xxviii + 732. Price 30s. net. Philadelphia and London: J. B. Lippincott Co., 1918.

To the student of cardiology, Dr. Hirschfelder's book offers a compendium of phenomena observed at the bedside with facts learned in the laboratory in order to show how each supplements the other in observation of the patient and in direction of treatment. At the end of each section a full bibliography is published, so that the totality forms one of the most useful text-books and works of reference in any language on this special subject. The numerous and excellent illustrations lend added value to the letterpress. The present edition records in the main changes of evolution. Graphic methods, which have now become routine are carefully dealt with, so that it is possible, even without firsthand acquaintance, to assess the precise diagnostic value of each. Studies with the volume pulse demonstrate the importance of back-flow in the peripheral arteries, and give a new meaning to pulse curves. Additional evidence is afforded for the contention of the author in 1908, and of Dr. Thomas Lewis in 1909, that extrasystoles, auricular tachycardia and fibrillation are closely related phenomena which represent an ascending scale of increased irritability of the heart muscle. Other new matter comprises studies of cardiac overstrain in soldiers, cardiac dyspnœa, the total volume of the blood in cardiac disease, hyperthyroidism, and the use of digitalis in large doses, various observers being quoted to show that the beneficial action of this drug is often greatest when the pulse-rate is slowed down to fifty to sixty beats per minute. Dr. Hirschfelder states that in order to obtain this result large doses may have to be administered for a considerable period of time, and the patient may entirely miss the benefit if half-hearted therapy is resorted to.

THE LIFE AND LETTERS OF JOSEPH BLACK, M.D. By Sir WILLIAM RAMSAY, K.C.B., F.R.S. With an Introduction dealing with the Life and Work of Sir William Ramsay, by F. G. DONNAN, F.R.S. With 7 illustrations; pp. xix + 148. Price 6s. 6d. net. London: Constable and Co., Ltd., 1918.

For many years Sir William Ramsay devoted one lecture a week during the summer term to the history of chemistry. Black originated the quantitative study of chemical reaction, and though chemical science has travelled far in the interval between "fixed air" and argon, the mantle so greatly and honourably worn by Ramsay was none other than that of Black. As he was, like Black, an alumnus of Glasgow University, it is most appropriate that he should have brought out this life and letters. At Glasgow, Black was a pupil of Cullen's and succeeded him there as lecturer on chemistry and again in Edinburgh as professor of chemistry (1766). As is not infrequently the case, Black's best work, that on latent heat and that on gases, was done at an early age, before he migrated to Edinburgh, where he passed an uneventful life in teaching his students and helping forward the cause of science and industry. His calm and attractive personality is well brought out in extracts from letters written by himself and by his friends; Lord Brougham describes him as "a person whose opinions on every subject were marked by calmness and sagacity, wholly free from passion and prejudice, while affectation was only known to him from the comedies he might have read." Five out of the seven illustrations are successful reproductions from the series of original portraits and caricature etchings made by John Kay and published in 1837, and special attention may be directed to "The Philosophers," Black and Hutton, whose intimate friendship is told in Chapter VII. Professor F. G. Donnan contributes as the introduction a sympathetic account of Sir William Ramsay's life and personality.

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The Chemical Constitution of the Proteins. By R. H. A. Plimmer, D.Sc. In three parts. Part I: Analysis. Third edition. Pp. xii + 174. Price 6s. net. London: Longmans, Green and Co., 1917.

The third edition of Dr. Plimmer's monograph on the chemical constitution of the proteins has been divided into three parts. As most of the new work done since the last edition appeared has been connected with analyses it has been thought advisable to devote the first part entirely to a consideration of the methods employed in protein analysis and their results. After an introductory description of the naturally occurring proteins, the author considers the effects of hydrolysis by different methods. He then passes on to the isolation and estimation of the amino-acids, and describes the composition of various proteins in amino-acids as obtained by different observers. Finally, the analysis of proteins by determination of the distribution of the various kinds of nitrogen is dealt with. A full bibliography is appended, and the former omission of references in the text to the papers quoted in the bibliography has been remedied.

Chemistry of Food and Nutrition. By Henry C. Sherman, Ph.D. Second edition, re-written and enlarged. Pp. xiii + 454. Price $2. New York: The Macmillan Co., 1918.

The science of dietetics and nutrition has been much neglected in this country, and, although British workers have contributed in some degree to the advances recently made in the subject, the bulk of the work has emanated from American laboratories. It is not surprising, therefore, that most of the current text-books dealing with the chemistry of food and metabolism also come from across the Atlantic. Some of them are highly technical and are suited more to the specialist than to the student or general practitioner, but the work under review, by the Professor of Food Chemistry in Columbia University, compiled as the result of several years' experience in teaching, does not belong to that class, and furnishes a concise yet sufficient summary of the subject for all who are interested in food as a factor in health and disease. The first edition, published in 1911, has now been re-written and enlarged. The scientific foundations on which our present views of food and nutrition are built are adequately described, and particular attention has been paid to the difficult task of presenting the striking results of some of the most recent investigations of the effects of various food constituents on growth and disease in such a manner as to make clear their importance without giving an exaggerated impression, and with due emphasis upon the fact that on many significant points any interpretation now offered is necessarily tentative. It should be pointed out that this book is concerned only with the chemistry of the subject with which it deals, and is especially concerned with the food requirements of man and those considerations which should guide our judgment of the nutritive value of foods. A detailed description of the individual articles of diet has appeared in another volume by the same author, entitled "Food Products." The two together form a useful introduction to the science of dietetics, and for those who wish to study any particular branch of the subject more deeply the references at the end of each chapter will afford a satisfactory guide.

THE OPERATIVE TREATMENT OF CHRONIC INTESTINAL STASIS. By Sir W. ARBUTHNOT LANE, Bt., C.B. Fourth edition. With 133 illustrations; pp. xii+328. Price 20s. net. London: Henry Frowde and Hodder and Stoughton, 1918.

In the fourth edition of Sir Arbuthnot Lane's well-known work the views of several authorities on special branches of medical science have been included as separate chapters. Professor J. G. Adami, who, in 1914, rather vigorously criticized the doctrine that seventeen symptoms and nine diseases were indirectly due to intestinal stasis, contributes an interesting and broad-minded essay on "Intestinal Stasis, Intoxication and Subinfection," and from further consideration finds how slight now is the difference of opinion between his and Sir Arbuthnot Lane's views. He agrees that strain brought to bear upon the mesenteries and main areas of suspension of the bowels results in the production of non-inflammatory bands, but, though he pays passing tribute to Dr. Mutch's work, originally published in the *Quarterly Journal of Medicine* (1914) and now reproduced in this volume, he shows reason for his belief that the diverse symptoms are not solely due to intoxication, but also depend on the escape of bacteria into the tissues and organs of the body. In support of the bacterial factor he quotes Rosenow's experimental production of fibrositis by streptococci of a low grade of virulence, and Mutch's conclusion that Still's disease is due to the growth in the intestine and passage into the circulation of the *Micrococcus citreus*. He, however, admits the existence of a considerable number of conditions both acute and chronic, of infectious origin—of non-specific morbid states—which may be produced, not by a single species of pathogenic microbe, but indifferently by several species, such as may be present in the alimentary canal. In his contribution on "The Great Bowel from an Anatomist's Point of View," Professor Arthur Keith concludes that the real cause of intestinal stasis is a lesion of the neuro-muscular system of the intestine, which in the first instance may be functional, though later structural changes may follow, the peritoneal bands and adhesions being not the cause but in most instances a mere accompaniment of stasis. Dr. Mutch's two papers contain the results of much laboratory research; the first, on the bacterio-chemistry of the small intestine, has already been mentioned; the second, on "Chronic Streptococcal Infection of the Alimentary Canal," is based on the examination of cultures secured at operation or from the colon immediately after its removal by Sir Arbuthnot Lane. Local delay is the primary, and deficient assimilation of food in the upper parts of the digestive tract the second, essential factor favouring streptococcal growth in the intestines, a rich nitrogenous diet being requisite for streptococcal growth, and for streptococcal predominance in the presence of *Bacillus coli*, which exerts an inhibitory influence, a generous carbohydrate admixture. The results of infection with *Streptococcus longus*—pain, diarrhœa, pyrexia, arthritis—are aggravated by excess of carbohydrates, and, clinically, benefit may result from diets either carbohydrate-free or protein-free. Dr. Jordan also has two well-illustrated articles—one at the beginning, the other at the end of the volume—on the skiagraphy of chronic intestinal stasis. The influence of intestinal stasis in hastening presbyopia by inducing sclerosis of the lens is whole-heartedly emphasized by Mr. Ernest Clarke. Sir James Mackenzie's chapter on "X-disease" from his well-known work is included, though at the time when it was written he had not yet come to the conclusion that he now has, that the condition he called X-disease and chronic intestinal stasis were identical. Major A. White Robertson describes the blood picture, and Dr. Leonard Williams the medical aspects of intestinal stasis. The main part of the volume is, of course, Sir Arbuthnot Lane's full account of the disease with which readers are in the main familiar. The evolution of his views is shown by the inclusion of articles—for example, "The Anatomy and Physiology of the Shoemaker"—written thirty years ago, on the effect of strain in producing changes in the skeleton, for a similar crystallization of resistance in the abdomen leads to the formation of bands which, at first serving a useful purpose, eventually become of pathological importance.

Typhoid Fever considered as a Problem of Scientific Medicine. By Frederick P. Gay. Pp. xi + 286. Price $2.50. New York: The Macmillan Co., 1918.

The author's purpose is to point out the relations of the laboratory and clinic in connexion with the problem of typhoid fever; he also aims at striking a balance between the clinical treatises of Curschmann and others on the one hand, and the many excellent laboratory and public health works on the other. It is the life-history of the typhoid bacillus that has been followed up in this book, rather than the manifestations of the disease it produces, and the book gives a very clear insight into the nature of the problem. The modes of infection, the diagnosis and sequelæ, occupy four chapters, and an excellent account of our present-day knowledge of the "carrier" state is found in Chapter VII. The author discusses at some length the questions of the general measures of prevention, the artificial immunization against typhoid fever, and also the protective value of vaccination against typhoid. A chapter is devoted to the paratyphoidal infections. In the chapter on treatment the author states that "the book is in no way designed to serve as a clinical manual . . . our consideration of the treatment of typhoid fever logically limits itself to a consideration of certain types of therapy which may be regarded as really efficacious in modifying the course of the disease or as specific in nature." The chapter on "Suggested Methods of Advance in solving the Typhoid Problem" is interesting. An exhaustive bibliography has been added, but there is no index.

The Chemistry of Synthetic Drugs. Second revised edition. By Percy May, D.Sc.Lond. Pp. 250. Price 10s. 6d. net. London: Longmans, Green and Co., 1918.

This is more than a mere description of the chemical nature and mode of preparation of synthetic drugs; attention is paid to the reactions between the drugs and the living organism, and as regards the relation between the chemical characters and pharmacological actions of drugs it is shown that wide generalizations cannot be drawn and that it is only in the case of closely related compounds that relationships can be traced. Valuable information can often be obtained by studying the changes that a drug undergoes in the animal body, for by this means light may be thrown on the action of the drug and guidance provided as to the preparation of fresh synthetic products of a less toxic nature, the usual alteration of drugs brought about by the metabolism of the body being in the direction of the conversion of an active and poisonous drug into one less active and less poisonous. Compared with foodstuffs, most drugs are destroyed with difficulty by the body, and owe their activity to this property, but if they are absolutely resistant they are quite inactive; substances with a specific action must be fairly resistant, otherwise they would react with all protoplasm. After three introductory chapters dealing with the theory and action of synthetic drugs, the effect of various elements and radicles, and the chemical changes of drugs in the organism, successive chapters are devoted to various groups of drugs, the narcotics and general anæsthetics, antipyretics and analgesics, the alkaloids, atropine and the tropeins, the morphine and isoquinoline groups of alkaloids, adrenalin and other derivatives of ethylamine, the derivatives of phenol, antiseptics, the purin derivatives (diuretics) and purgatives. In the chapter on the arsenic and antimony compounds a good description is given of the salvarsan preparations and reference is made to Danysz's luargol. The last chapter, "on various other compounds of interest" deals with the glucosides, camphor, and, among the sulphur compounds, with ichthyol, ichthalbine, and intramine or di-o-aminophenyl-disulphide. There is a useful index and the book is of a convenient size and get-up.

HYGIENE OF THE EYE. By WM. CAMPBELL POSEY, A.B., M.D. With 120 illustrations; pp. x + 344. Price 18s. net. Philadelphia and London: J. B. Lippincott Co., 1918.

The main object of this work is an appeal to the general public in respect of matters concerned in the preservation of the eyesight. Thus from the educational point of view the subject is fully discussed, in relation to errors of refraction, spectacles, strabismus, artificial lighting, and school life generally, and the daylight illumination of rooms and buildings. A review follows of the more common diseases of the eye, and observations are added upon the manner in which the eye is affected by the general health. Blindness and the diseases and conditions leading to it are discussed together with the national movements which are being made towards its prevention. Particular attention is given to ocular injuries, arising from the risks incurred in the course of industrial occupations, and the means of preventing such injuries. A good deal of elementary knowledge of the subject is contained in the twenty chapters, and the language employed by the author is as free from technicalities as his subject permits. A full index completes the volume.

A HISTORY OF THE BRISTOL ROYAL INFIRMARY. By G. MUNRO SMITH, M.D., L.R.C.P.Lond., M.R.C.S. With 87 illustrations; pp. xiii + 507. Price 12s. 6d. net. Bristol: J. W. Arrowsmith, Ltd., 1917.

The author of this work did not live to see the completion of his labours, but a large portion of it was in type, and the proofs were corrected by him before he passed away, on January 13, 1917. Some quaintly worded memoranda of the early part of the eighteenth century show that the Bristol Royal Infirmary was founded in or about the year 1735. This book is the history of the institution from that date down to June 28, 1912, when the new surgical wing was opened by Their Majesties the King and Queen. But while the historical object is rigidly adhered to in the narrative, at the same time that only forms the basis for an extraordinary number of anecdotes, for the most part humorous, relating to the old medical worthies of Bristol and to the patients under their care. The sidelight which these anecdotes throw upon medical practice in the eighteenth century is not only very entertaining, but instructive. The book is a storehouse of medical stories, unfamiliar, and worthy of the telling.

DISEASES OF THE EYE. By J. HERBERT PARSONS, D.Sc., M.B., B.S., F.R.C.S. Third edition. With 18 plates and 319 text figures; pp. viii + 667. Price 16s. net. London: J. and A. Churchill, 1918.

The author has made considerable additions to the text in this new edition. There is a new section devoted to symptomatic diseases of the eye, inclusive of the ocular manipulations of nervous and other diseases; more space has been given to operative treatment, especially in relation to the complications of cataract extraction and the more modern methods of dealing with glaucoma, by means of trephining. An exhaustive index is another feature worthy of notice. Although much new matter has been added the author has contrived to reduce somewhat the size of the volume in comparison with the last edition.

CLINICAL CARDIOLOGY. By SELIAN NEUHOF, B.S., M.D. With 20 plates and numerous other illustrations; pp. xix + 302. Price $4.00. New York: The Macmillan Co., 1917.

At a time when the subject of heart disease is being copiously written about in this country, English readers will be interested in learning how the problems are viewed from the American standpoint. The author describes the various mechanical aids to the study of heart disease, and shows how the information gained through them may be applied clinically. The polygraph and electrocardiograph and orthodiascope are fully described and the tracings made by them are explained. An important section on the "arrhythmias" follows, in which the author explains in detail the significance of the various forms of irregular cardiac action, their recognition by ordinary bedside methods, and their differential diagnosis. Endocarditis and valvular murmurs are described after the method of the older writers. The thorny subject of blood-pressure is fully dealt with and the conclusions of the writer may be commended to those who pin their faith to the value of sphygmomanometric readings. As regards therapy in circulatory diseases, he deals only with those drugs which upon careful clinical and pharmacological investigation have proved of real value. About digitalis he notes the interesting fact that before the appearance of symptoms of overdosage the patient may complain of "extreme hunger and hunger pangs." He regards this symptom as indicating that sufficient digitalis has been taken, and considers it due to the stimulating effect of the drug on the vagus nerve. The author's intention of emphasizing the clinical side of cardiology is certainly carried out. He gives a number of clinical records of cases to illustrate the various conditions dealt with. The personal note runs all through the book, the author presenting the subject from his own point of view and from his own experience. A final chapter on the therapy of pneumonia from the circulatory standpoint is not encouraging to the therapeutist who indulges freely in "cardiac stimulants" in this disease.

Studies in Electro-physiology (Animal and Vegetable). By Arthur E. Baines, Consulting Electrician. With 10 coloured plates and 146 other illustrations; pp. xxix + 291. Price 12s. 6d. net. London: George Routledge and Sons, Ltd., 1918.

Studies in Electro-pathology. By A. White Robertson, L.R.C.P. & S.E., Temporary Major, R.A.M.C. With 2 coloured plates and other illustrations; pp. viii + 304. Price 12s. 6d. net. London: George Routledge and Sons, Ltd., 1918.

Mr. Baines lays emphasis on three points: the oneness of life, the part electricity plays in vegetable and animal life, and the suggestion that the electromotive force should be made a factor in the diagnosis and treatment of disease. The oneness of life so ably demonstrated by Darwin, Wallace and others in the nineteenth century finds fresh evidence in the twentieth in such scientific works as those under review. Professor Bose, of Calcutta, has already familiarized us with the fact that plants respond to mechanical, chemical and electric stimuli. Mr. Baines here shows that a similarity exists in vegetable and animal life not only in locomotion and sensitiveness, but also in the part electricity plays in their growth, nutrition and reproduction. Time was when the scientific world largely theorized on the physical basis of life. We went a step further when we found that chemical actions accompanied and influenced all vital phenomena. Mr. Baines takes us further still when he explains that chemical functions are controlled by the electromotive force generated within the organism itself. Perhaps one day we shall go higher still (if we have not done so already) and find that all physical, chemical and electrical phenomena in the organism are dominated by the spirit within, which is the ultimate basis of life and its various activities. The author's main contention is that man, like plants, is a self-contained electric machine, that the structure of the body is primarily electrical and that electro-motive force precedes all chemical changes in the body. He brings evidence to show that muscular impulse is due to neuro-electrical and not to chemical disturbances, and that the nature of nerve impulse is also neuro-electrical. Whether vital resistance is synonymous with electrical resistance in the blood and tissues, and how far we are justified in interpreting all life's functions in electrical terms, the future will decide. Meanwhile both Mr. Baines and Dr. A. W. Robertson set out to prove that chemical degenerative changes are marked by electrical diffusion, and that disease occurs when there is a loss of electrical resistance. A rise of temperature has much the same effect upon enzymes as it has upon the velocity of nerve impulse, so that we may well believe that enzymic and metabolic action instead of being wholly chemical may in some measure be electrical. Besides raising the question of interpreting vital phenomena in electrical values, the authors open up a wide field in indicating new lines of medical research. The study of biochemistry and chemical pathology suggests that disease may be due to some disturbance in the manufacture and elaboration of chemical elements such as catalysts, enzymes, vitamines, &c. The study of electro-physiology and electro-pathology may divert our research from bacterial and chemical factors to the generation and diffusion of electromotive force in the body system, and thus compel us to modify or revolutionize our ideas concerning the ætiology, the diagnosis and treatment of disease.

LYON'S MEDICAL JURISPRUDENCE FOR INDIA, WITH ILLUSTRATIVE CASES. By L. A. WADDELL, C.B., C.I.E., LL.D., M.B., F.L.S. Sixth edition. With 69 illustrations; pp. xiii + 783. Price 28s. net. Calcutta and Simla: Thacker, Spink and Co., 1918.

This book has been revised, and several of the chapters rewritten. Dr. Waddell follows the arrangement usual in most text-books on forensic medicine. In his early chapters he deals with medical relations with law courts, and he covers fully the special difficulties in detecting crime peculiar to India. Methods of identification of both the living and the dead are then considered, and in the succeeding chapters various forms of death from violence are examined. Numerous illustrative cases call attention to the differences in medico-legal methods in India and this country. In the chapter on rape, there is an interesting diagram of the *Trichomonas vaginalis* drawn from life by Professor A. Powell. This shows that the figures of the organism which appear in the standard text-books are seriously inaccurate in important respects. The second part of the book is devoted to toxicology, and contains accounts of many Indian poisons which are unfamiliar in this country. Numerous clearly drawn illustrations are included in the book.

PROTHÈSE ET CHIRURGIE CRANIO-MAXILLO-FACIALE. Par J. LEBEDINSKY et M. VIRENQUE. Préface de Dr. H. DELAGENIÈRE. With 421 illustrations; pp. xvi + 398. Price 27 fr. Paris: J. B. Baillière et fils, 1918.

MM. Lebedinsky and Virenque, dentist and surgeon respectively, record their experiences of eighteen months' work and over 700 cases in the centre of surgery and prosthetics of the fourth region. Perhaps the most interesting part of the work is that describing the technique and results of osteo-periosteal grafts taken from the inner surface of the tibia and used in cranioplasty, grafting of the mandible, and restoration of facial contour. From a short preface we learn that the process is due to H. Delagenière, chief surgeon of the second surgical section of the fourth region. An autograft must be used, and immobilization and intimate contact between the graft and the receiving bone are essential since the available evidence seems to show that part at least of the success of the operation is due to bone-forming elements growing into the graft from the adjacent bone. Of fifteen cases of mandibular grafting, nine resulted in complete cure, two showed slight mobility between the fragments, one was unimproved—the patient being refractory, four were of too recent date to report on. In cranioplasty and facial restoration the results have been uniformly good. In cranioplasty the slight curve which the suggested graft takes as it is peeled off the tibia becomes a useful factor in avoiding compression. A large part of the work is devoted to injuries of the jaws requiring collaboration of dentist and surgeon. The dentist's rôle consists chiefly in devising apparatus for the reduction of deformity and the maintenance of immobility. Though there is nothing new in the various apparatus employed, nothing that is useful has been omitted. Exception may perhaps be taken to the form of splint fixation, figured on p. 158, in which a screw passes between two teeth—it appears unclean and painful. The authors recommend early fixation of fractured jaws by means of an "appareil de contention," claiming that thereby disinfection is favoured and diffusion of infection prevented. Many who have seen cases of early fixation at a later period will be inclined to argue that a splinted jaw demands greater attention to the minutiæ of cleanliness than an unsplinted jaw. The fact, however, that MM. Lebedinsky and Virenque are able to report good results from its use shows that, in careful hands, the patient may be given the undoubted advantages of early fixation. The authors aim always at securing a soundly-healed jaw, holding that no apparatus can compensate for the disability consequent on failure of bony union. Immobility of the jaw has been found in 96 per cent. of the cases to be amenable to bloodless treatment by stretching, being most often of myopathic origin; cases needing operation might have been lessened by early treatment. Restoration of facial contour, especially of the nasal part, is the subject of many interesting pages, and the authors record their observations of practically every injury that occurs as a result of craniofacial wounds—traumatic aneurysm, injury of cranial nerves, secondary hæmorrhage, &c. Every class of case is illustrated from life, and the numerous photographs and X-ray pictures explain the text most admirably. Throughout, the importance of early disinfection is insisted on, and one cannot help feeling, after reading the book, that a sound application of surgery is of more importance, even in treating mandibular injuries, than skill in mechanics. The authors show how much may be done to remedy facial deformity by skill and patience, but, to judge by their records, do not seem to have had the handling of the severest cases in which large parts of bone and soft parts have been torn away.

THE SOLDIERS' HEART AND THE EFFORT SYNDROME. By THOMAS LEWIS, M.D., F.R.C.P., F.R.S., D.Sc. Pp. xi + 144. Price 7s. 6d. net. London: Shaw and Sons, 1918.

Disorders of the cardiovascular system found in patients discharged from the Army for "disordered action of the heart" (D.A.H.) and for "valvular disease of the heart" (V.D.H.) form the main subject of this book. As at least one such patient has been kept in the Army for every man discharged, no less than 70,000 soldiers have been classed under these headings since the beginning of the war. These purely army terms are chiefly made up of disorders and not diseases. The majority of cases consist of patients who have no structural heart disease, but form, under the heading of "effort syndrome," which constitutes a complex of symptoms and signs, a group showing exaggerated reactions of the body to exercise. The term is used by Dr. Thomas Lewis to gather together certain usual symptoms and signs, "independently of the manner in which these are brought about or the disease from which the patient actually suffers." Under "effort syndrome" are included breathlessness, palpitation, præcordial pain, giddiness or faintness, fatigue and exhaustion, headache, sweating, and other peripheral phenomena, together with increased heart-rate and rise of blood-pressure on slight exertion. The author aims at helping the medical officers of recruiting, discharging, and pensioning boards, and others in charge of patients. Two appendices deal with medical reports on discharged soldiers and with routine examination of the heart in recruits, &c.

THE UNSOUND MIND AND THE LAW: A PRESENTATION OF FORENSIC PSYCHIATRY. By GEORGE W. JACOBY, M.D. Pp. xiv + 424. Price $3. New York and London: Funk and Wagnalls Co., 1918.

The writer states he has written this work because he considers it the duty of every neurologist and psychiatrist to contribute his share to the practical extermination of the extraordinary conceptions of mental disorder that conflict so sharply with our present-day knowledge, and not infrequently place insuperable obstacles in the way of correct juristic estimation of medico-legal problems affecting the insane. As an introduction, he shows how antiquated the law is in dealing with the questions of mental responsibility, and points out the necessity for some training of the legal mind in this respect, without which justice cannot be adequately meted out. An historical retrospect on the conceptions of mental disease is given, and in modern times he thinks we can have no better pattern of the medico-legal psychiatric practice than that furnished by the civil and criminal statutes of Germany. Chapters follow on the notion of mental disorder, psychopathic disposition, exogenous causes of mental disease, and the responsibility of those mentally afflicted. Many pages are devoted to the examination of the insane, and are followed by a description of the psychoses and neuro-psychoses with their differential diagnosis and forensic aspects. The third part of the book deals with hypnosis in its medical and legal aspects and the anomalies of sexual sense. In conclusion, some practical examples are given of cases where responsibility was in question, and written reports on their mentality are presented in some detail. The author throughout is an advocate of psycho-physical parallelism, and the value of the book would have been much greater had the writer's conception of mental disease been more modern. It seems important to draw attention particularly to two statements made which are much at variance with present-day knowledge. "'The expression 'mental disease' is misleading, inasmuch as it conveys the impression of a disease of the mind as opposed to a disease of the body. Mental disease is bodily disease, and differs from other forms of such affliction merely by reason of the fact that it has its seat in the brain." And also that: "psychology is but part of the physiology of the central nervous system."

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SUPPLEMENT

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NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

Tumours: their Nature and Causation. By W. D'Este Emery, M.D., B.Sc.Lond. Pp. xx + 146. Price 5s. net. London: H. K. Lewis and Co., Ltd., 1918.

The theory is advanced that cancers and tumours are of parasitic origin, the parasite being of so small a size as to defeat our present means of observation. This ultra-microscopic microbe lives inside the cell or its nucleus and produces a toxin which induces cell-division. According to this theory, the microbe probably exists in a state of symbiosis with a tissue cell and these together form the equivalent of a new individual which behaves as a parasite. Reasons are offered in support of these postulates, and the natural history of neoplasms is reconsidered in the light of the author's theory. It is suggested that there is much in the histology and conduct of neoplasms in favour of the theory and that experimental work supports it. On the other hand difficulties which arise in connexion with transplantation, the specificity of neoplasms, age-incidence and the production of immunity are all capable of satisfactory explanation.

Hypnotic Suggestion and Psycho-therapeutics. By A. Betts Taplin, L.R.C.P. and L.M.Edin. Pp. 168. Price 10s. 6d. net. Liverpool: Littlebury Bros., 1918.

A short summary of the subject, covering problems of (1) conservation, dissociation, automatism, and emotional energy; (2) therapeutics;—re-education and persuasion, waking suggestion, psycho-analysis, and hypnotic suggestion. The remaining third of the book is devoted to the application of the author's teaching to conditions such as neurasthenia, psychasthenia, dipsomania, neuritis, chorea, Menière's disease, asthma, skin disease, and moral insanity. Obviously, in a small work of 168 pp. the treatment of these topics is concise, but as the work is intended primarily for medical men, the author has assumed some knowledge of the subject on the part of the reader. His practical hints on methods, culled as they are from an evidently wide experience, are of much value. The book is written with conviction, and with a first-hand knowledge of the subject; the author wastes no time on speculative matters, and his teaching will be appreciated both by students and practitioners. One only wishes that Dr. Betts Taplin had given himself more scope, especially in his account of the principles upon which medical psychology is based.

INTRAVENOUS INJECTION IN WOUND SHOCK. Being the Oliver-Sharpey Lectures delivered before the Royal College of Physicians of London in May, 1918, by W. M. BAYLISS, M.A., D.Sc., F.R.S. Pp. xi + 172. Price 9s. net. London: Longmans, Green and Co., 1918.

This is an amplification of the lectures published in May, 1918, and embodies the conclusions of the "Special Committee for the Investigation of Surgical Shock and Allied Conditions" appointed by the Medical Research Committee and presided over by the author. The term "wound shock," suggested by Cowell in 1917, does not include the mental disturbances sometimes known as "shell shock," and its most obvious signs are a low blood-pressure and the consequences of deficient blood-supply to the vital organs, and especially the nervous centres, that result therefrom. The primary cause of wound shock is unknown, and the author shows that the hypotheses that it is due to acapnia, exhaustion of the adrenals or of the nerve centres, inefficient cardiac contraction, or vasomotor paralysis are untenable. The question of acidosis is considered at length and the conclusion is reached that the acidosis sometimes present in wound shock is innocuous in itself and may even be beneficial in increasing the supply of oxygen by greater pulmonary ventilation. The state brought about by hæmorrhage alone is in practice very difficult to distinguish from secondary wound shock, and the view that has most evidence in its favour at present is that in both states there is a loss of blood from currency, or "exæmia" in Cannon's phraseology. One of the most serious causes of wound shock is the absorption from injured tissues, especially muscles, of toxic products which, like histamine, dilate the capillaries and by thus causing stasis withdraw the blood from circulation. The means of treatment are led up to throughout and thoroughly discussed; isotonic and hypertonic salt transfusions effect transient improvement only, as the fluid escapes from the vessels in about half an hour, and the use of vaso-constrictor drugs is deprecated. Transfusion of blood or injection of preserved red blood corpuscles is the logical course, and in cases with hæmorrhage it would naturally be first employed, but the intravenous injection of a 6 per cent. solution of gum arabic in 0·9 saline solution does nearly or quite as well and has advantages in the greater ease with which it can be obtained, and in other ways, such as absence of tests to avoid hæmolysis and agglutination of the red cells. A pint should be given at once and repeated if and when necessary.

PAPERS ON PSYCHO-ANALYSIS. By ERNEST JONES, M.D., M.R.C.P.Lond. Revised and enlarged edition. Pp. x + 715. Price 25s. net. London: Baillière, Tindall and Cox, 1918.

As the title implies the book is merely a compilation of papers on many of the topics which come within the scope of psycho-analysis; but the author gives his readers, step by step, with almost as much system as a text-book, a clear account of the subject and the light it throws upon the bases of human thought. The work is interesting and helpful, not only to those who wish to know what psycho-analysis is, but also to those already engaged in psycho-analytic investigation. The psychological principles here discussed have primarily a bearing upon the psychopathology and psychotherapy of functional nervous and mental disorders; but they are also of importance in every walk of life and will in future have special significance in the education of the young. The work deals with such a wide range of subjects and is everywhere so full of information that an abstract, if this were possible, could only give erroneous impressions. The book itself must be read from cover to cover.

THE ADVENTURE OF LIFE. By ROBERT W. MACKENNA, M.A., M.D. Pp. xiii + 306. Price 6s. net. London: John Murray, 1919.

Addressed to the intellectual public, the author makes a strong appeal, mainly from the biological standpoint, for the abandoning of the purely materialistic theory of life. The idea of the immanence of God in nature and in human life is not inconsistent, he maintains, with the workings of the great natural forces. "Is it an impious assumption," he asks, "to imagine that when we come to consider life we shall find that the Creator is true to His own methods and uses a form of energy which we may call the life-force or life-wave to quicken protoplasm to activity?" The author holds that problems of life, dark and obscure though many of them may be, are not incapable of solution, and encourages us to believe that the clue to life's mysteries has its origin in Law, while it ends in Providence. Written. as this book was, in a little bell-tent within sight of a tortured city in Northern France, the author derives consolation from the golden figure of the Madonna and Child towering over the inhabitants from a lofty pinnacle of the church, which stands as "a perpetual witness to remind us that, though man may make a mess of his life and by the misuse of his talents and opportunities bring suffering and evil upon the earth, over all and above all there still reigns triumphant—God."

Meat Inspection Problems; with Special Reference to the Developments of Recent Years. By William J. Howarth, M.D., D.P.H. Pp. viii + 143. Price 6s. net. London: Baillière, Tindall and Cox, 1918.

The last four chapters of this book formed the Milroy Lectures in 1917. Chapter I gives a brief account of the development of meat inspection in England. Chapter II deals with general administrative problems as they concern the inspection of flesh meat. The inequality of meat inspection in different parts of the country is emphasized, while the facilities which exist for adequate inspection are considered. A good deal of attention is paid to the subject of the marking of meat after inspection. The author considers that under existing conditions a universal system of compulsory meat marking is impracticable, but he advocates such a system on an adoptive basis under Government control. The continental system of a three standard basis of meat inspection is only very sketchily dealt with. Chapter III deals with the tuberculosis problem as affecting cattle. Extended consideration is given to the subject of the paths of infection in cattle, and this is the more valuable because of the detailed description given, in Appendix I, of the lymphatic system. The Recommendations of the Royal Commission receive careful consideration. Chapter IV deals in considerable detail with the tuberculosis problem as affecting pigs. Chapter V is concerned with imported meat and is largely occupied with a description of the pathological conditions which may be met with in imported carcases and other parts of meat. The foreign meat regulations are briefly described, and a short account is given of the regulation of cold stores. Chapter V concludes with a number of definite recommendations which the author considers necessary in order to put meat inspection on a more satisfactory basis. The appendices include one upon the inspection and manner of packing of imported offal and boneless meat and one upon the sale of sterilized unsound meat.

The Intensive Treatment of Syphilis and Locomotor Ataxia by Aachen Methods (with Notes on Salvarsan). By Reginald Hayes, M.R.C.S. Third edition. Pp. vii + 92. Price 4s. 6d. net. London: Baillière, Tindall and Cox, 1919.

The author has doubtlessly written this book with the object of bringing before the present-day syphilologist what may be achieved, especially in nervous syphilis, by mercurial inunctions, properly performed. Aachen was the German Mecca for sufferers from syphilis, and owed its popularity not only to the efficient way in which inunctions were carried out, but also to the fact that the combined treatment with sulphur was practised there. Now that the rationale of the action of sulphur is understood, and excellent compounds of this drug have been manufactured in England, the author shows that sufferers can now obtain as efficient treatment in this country as by going abroad for it. Inunctions are not boomed to the exclusion of arseno-benzene, but given a place where they are more suitable.

Handbook of Physiology. By W. D. Halliburton, M.D., LL.D., F.R.C.P., F.R.S. Fourteenth edition (being the twenty-seventh edition of "Kirke's Physiology"). With numerous illustrations; pp. xx + 936. Price 16s. net. London: John Murray, 1919.

The present edition of this well-known text-book has followed so closely upon the previous one that only minor alterations in the text have been necessary. An appendix on war diet is of present-day interest, but, as the author says, all will hope that it will not be a permanent feature of the book.

THE SCIENCE AND ART OF DEEP BREATHING AS A PROPHYLACTIC AND THERAPEUTIC AGENT IN CONSUMPTION. By SHOZABURO OTABE, M.B.Tokio, M.D.Bâle. Pp. viii + 114. Price 5s. net. London: John Bale, Sons and Danielsson, Ltd., 1919.

The science and art of deep breathing is here recommended as a prophylactic and a therapeutic agent in consumption. For many years past in this country the practice of deep breathing has been recommended by certain physicians for this special object as well as in its more general applications, and in Japan Professors Kitasato and Futaki have earnestly recommended this most useful method. The author begins by stating the motive which induced him to study and apply this method first to himself and then to a more extended circle with beneficial results. He then deals with the methods which he advocates, and the salutary effects of deep breathing on the whole body, the mind, and in the prevention of consumption. Dr. Otabe has also found the method of service in the treatment of consumption, and compares it with the effects of graduated labour on the whole body, which connotes gradual exercise of the lungs. "Therefore, if we would take care of the physical condition of the patient and the state of his disease, we should recommend deep breathing to him with the same discretion and under similar rules as we recommend graduated labour." One chapter is devoted to experiments in deep breathing on animals, showing the prophylactic effects on consumption. These investigations carried out on marmots, infected with tubercle bacilli through the blood and lymph, are held by the author to show that the daily application of deep breathing to some extent prevented development of the tuberculous process in the lungs, but one cannot say that the results are convincing. The book represents an interesting attempt to direct more widespread attention to a method of prevention and treatment which is ofttimes overlooked in the search for more dramatic if less certain methods.

THE EDINBURGH SCHOOL OF SURGERY BEFORE LISTER. By ALEXANDER MILES, Surgeon to the Royal Infirmary, Edinburgh. With 8 plates; pp. viii + 220. Price 5s. net. London: A. and C. Black, Ltd., 1918.

The various phases in the development of the pre-Listerian school of surgery in Edinburgh are set forth in this little book in twelve chapters. The history of the barber-surgeons marks the first phase in the genesis of the surgical school, whilst the early anatomical school, with James Borthwick at its head, may be regarded as the next stage. The Faculty of Medicine in the University was not founded, however, until 1726. The old Royal Infirmary was opened in 1741, but it was not until the second half of the eighteenth century that a definite school of surgery arose in Edinburgh, with Benjamin Bell as its "Father." In 1777 a Professorship of Surgery was established within the University, and Alexander Monro, the second, was its first holder. The College of Surgeons instituted a separate Lectureship in Surgery in 1804, with John Thomson as the first professor. It was not until 1831, however, that the Crown established a separate Chair of Systematic Surgery, on the recommendation of the Town Council, with John William Turner as its first incumbent. The Chair of Clinical Surgery had been erected in the previous year by King George III, and James Russell was the first holder. Three years later the Chair of Military Surgery was also founded by Royal patronage, with John Thomson as the first professor. The importance of the Extra-mural School as a factor in medical education is insisted upon, for from its ranks the professoriate has been largely recruited. Such names as Robert Liston, John Lizars, William Fergusson, Richard J. Mackenzie, and James Syme, suffice to show the brilliance of the Extra-mural School in the fifty years preceding the Listerian epoch. The period of Liston and Syme mark the zenith of the fame of the pre-Listerian era of the Edinburgh Surgical School. The performance of the first major operation under ether anæsthesia in England by Liston at University College Hospital in 1846 is described, as well as the first amputation at the hip-joint performed in Scotland by Syme in 1823. An account of Syme's operation for axillary aneurysm in 1869, is detailed on p. 198, and for the first time brings us into touch with "Mr. Lister," who assisted. As an historical monograph, enriched by many photographs, this book will be prized by students of medical history.

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SUPPLEMENT

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NOTES ON BOOKS.

[*The purpose of these "Notes" is not so much to praise or to blame as to draw attention to and describe some of the new books and new editions which have been added to the Society's Library.*—ED.]

GILBERTUS ANGLICUS: MEDICINE OF THE THIRTEENTH CENTURY. By HENRY E. HANDERSON, A.M., M.D. With a biography of the Author. Pp. 77. Published posthumously for private distribution by the Cleveland Medical Library Association, Cleveland, Ohio, 1918.

This epitome of the Compendium Medicinæ of Gilbertus Anglicus is published posthumously by a Committee of the Cleveland Medical Library Association of Cleveland, Ohio. Dr. Samuel W. Kelley and Dr. Clyde L. Cummer, the editors, have done their work well and modestly. They have prefixed a portrait and a short biography of Dr. Handerson, and have then printed the essay without further comment. The facts about Gilbert's life are few, and it is difficult to determine the exact date at which he lived. Dr. J. F. Payne gives 1170-1230; Mr. C. L. Kingsford places him twenty-five to thirty years later; and Dr. Freind later still. Dr. Handerson, after a careful examination of all the facts, states that he was probably born about 1180; published the Compendium or Laurea Medicinæ, as it is sometimes called, in 1240, and died in 1250. He lived at any rate before the period when medicine and surgery were as sharply separated as they afterwards became, for the work contains chapters on surgery, though it is chiefly devoted to medicine. Dr. Handerson indeed goes so far as to say that the chapters on surgery "present a more scientific and complete view of surgical art, as then known, than any contemporaneous writings of the Christian West, outside of Italy." The Compendium, as its name implies, is "a book of general and special diseases, selected and extracted from the writings of all authors, and the practice of the professors." This is Gilbert's own description of his book, and in another place he says: "It is our habit to select the best sayings of the best authorities, and, where any doubt exists, to insert the different opinions, so that each reader may choose for himself what he prefers to maintain." The book, therefore, like that of Bernard Gordon, is essentially a text-book, but Gilbert does not hesitate to state his own views on various questions, and, like all good teachers, he taught dogmatically. There are a few misprints, none serious, but there is no index, and this the editors should have supplied.

ORGANIC TO HUMAN: PSYCHOLOGICAL AND SOCIOLOGICAL. By HENRY MAUDSLEY, M.D. Pp. viii + 386. Price 12s. net. London: Macmillan and Co., Ltd., 1916.

The author attempts to trace development from organic existence to human life, and holds the balance between various schools of thought, the spiritual and the material. He deals with life and its crystallization into mere existence or mental expansion, from the aspects of psychology and sociology ,and when human life as such is reached, it is considered psychologically and socially. As we pass towards the concluding chapters one seems to hear the words of the preacher, "All is vanity and vexation of spirit"; "Mind is an organized federation of many nervous plexuses or so-called complexes"; "The largest part of mind is usually quiescent in its habitual functioning, and a large part of its mentality always undeveloped." Mind, we are told, does not itself perform; the concrete person, not the abstract metaphysical freewill in the particular self, is concerned with every conscious thought and act. Mind being fundamentally life in mind, necessarily suffers with its sufferings. If it is true that there is nothing good or bad, but thinking makes it so, it is more deeply true that there is no thinking, good or bad, but the body makes it so. Sex and its activities are considered in their relation to consciousness and continuity in life. This onlooker upon the passing show of life seeks to see whither man's activities trend. He interrogates science—i.e., the teaching of observed phenomena and deductions therefrom. Heredity, man-made schemes for melioristic advance; Religion, with its clamant call to prayer; Social Democracy, the aims of which, it is pointed out, are too often predatory rather than moral—all pass under a searching review, weighed in the balance, and found wanting. Yet the seer contends no one can doubt that betterment—physically, mentally, and morally—is slowly being evolved through the welter of the ages which, so immense to a generation, is a grain of sand in eternity. Education offers, it is hoped, a means for advancement, but to what? Is each generation to gain, and then must come the end? Free will cannot act without memory, and the exercise of memory needs that we take account of the necessary physical antecedents of the ego, and of memory itself. Metaphysics must, without the aid of biology, prove a blind leader of sightless humanity, but there are paths along which, if we admit their existence, biology leaves metaphysics unguided and alone. The discarnate ethereal spirit, the yearning faith in God, and a supersensual communion in a life after death, remain problems unsolved save by him who admits that what his finite mind cannot grasp, his trained finger may not probe.

A TEXT-BOOK OF MIDWIFERY FOR STUDENTS AND PRACTITIONERS. By R. W. JOHNSTONE, M.A., M.D., F.R.C.S., M.R.C.P.E. Second edition. With 264 illustrations. Pp. xxvi + 495. Price 12s. 6d. net. London: A. and C. Black, Ltd., 1918.

This second edition follows the lines of the first edition, published in 1913. It gives in 482 pages all the midwifery that a student needs, and is a welcome change from the numerous large and expensive text-books that have been published in recent years both here and in America. It contains the Edinburgh teaching in a concise and clear form and, in places, saves space by being dogmatic. Tables and classifications are given that should be of considerable use to a student preparing for examination. This edition has been thoroughly revised in spite of the difficulties occasioned by the absence of the author on service, and new articles on the use of scopolamine-morphine and of pituitary extract in labour have been added. The articles on the development of the ovum and placenta, and on the physiology of pregnancy, are unusually full for a book of this size.

MALARIA AND ITS TREATMENT, IN THE LINE AND AT THE BASE. By Captain A. CECIL ALPORT, R.A.M.C.(T.), M.B., Ch.B.Edin. With 8 coloured plates and 30 other illustrations; pp. xii + 279. Price 21s. net. London: John Bale, Sons and Danielsson, Ltd., 1919.

The author describes his experience in the treatment of several thousands of cases of malaria in Macedonia. The outstanding feature of the work is the writer's contention, based on the results of personal observation, that larger doses of quinine than those usually given are necessary for the successful treatment of this disease. Several chapters are devoted to the treatment of severe types of the malady, such as cerebral malaria, bilious remittent fever, &c., and in these cases intravenous and intramuscular injections of quinine are strongly recommended in order to make an immediate attack on the parasites in the blood. Records of the treatment and progress in a large number of cases are given to illustrate the efficacy of the methods used. The technique for intravenous injection is described in detail. In the treatment of chronic malaria, the author considers that inadequate doses of quinine are frequently employed; and he recommends, generally speaking, 30 gr. *per diem* for a period of several months. For malarial anæmia, he finds arsenic by the mouth the most useful remedy, intravenous injections of galyl being of service only in special cases. The value of lumbar puncture for the differential diagnosis of cerebral malaria from meningitis due to various causes is pointed out. The different views regarding the obscure ætiology of blackwater fever are briefly discussed. The author is of opinion that it is due to neglected malaria, with cold and fatigue as predisposing causes of an attack, and he emphatically advocates the administration of quinine as the correct line of treatment. A careful distinction is drawn between blackwater fever and malarial hæmoglobinuria ("redwater fever"), on the one hand, and quinine hæmoglobinuria on the other. In the latter condition quinine is of course withheld. A short description of the morphology and life-cycle of the malaria parasite, of the natural history of mosquitoes, and of prophylactic sanitary measures in malarial countries, are included in the volume.

The Twin Ideals; an Educated Commonwealth. By Sir James W. Barrett, K.B.E., C.B., C.M.G., M.D., M.S., F.R.C.S.Eng., Temporary Lieutenant-Colonel R.A.M.C. In two volumes, with maps and diagrams. Pp. xxxii + 512 and xx + 504. Price 25s. net. London: H. K. Lewis and Co., Ltd., 1918.

The author has published these volumes of essays, because of the interest his son, to whose memory they are dedicated, took in the problems discussed. Captain K. J. Barrett was killed in France on April 16, 1917. The essays comprise a remarkable variety of subjects. To enumerate the titles of all of them within the space at our command would be impossible. Many are devoted to university questions; others to education, medicine, venereal disease, town-planning and playgrounds, rural life, travel and immigration, music, electoral reform, Imperial and Australian politics. The cosmopolitanism of the author's views, widely manifested, has been gained by travelling in countries for his personal information, and obviously by extensive reading. His chief outlet for publication was the *Melbourne Argus*, but some of the essays have appeared, as contributions, in the London daily newspapers. Candidly, these volumes provide interesting instruction; the views expressed are fresh and stimulating, the style is vigorous and easy, and the remarkable fact remains that an ophthalmic surgeon was able to find the time, amid his professional duties, to make himself an authority upon so many diverse subjects.

The Australian Army Medical Corps in Egypt: an Illustrated and detailed Account of the Early Organization and Work of the Australian Medical Units in Egypt in 1914-1915. By Sir James W. Barrett, K.B.E., C.M.G., M.D., M.S., F.R.C.S.Eng., Temporary Lieutenant-Colonel, R.A.M.C., and Lieutenant P. E. Deane, A.A.M.C. With 37 Plates. Pp. xiv + 259. Price 12s. 6d. net. London: H. K. Lewis and Co., Ltd., 1918.

A record mainly based upon the authors' experience in connexion with No. 1 Australian General Hospital in Egypt. This hospital was the first effort of the Australian Government to organize a medical service at Alexandria. Provision was made for 520 beds in the Heliopolis Palace Hotel, and then began a stupendous work, which culminated in the bed accommodation being extended to 10,500 cases. The organization was barely in hand before the arrival of the wounded from Gallipoli. The book must be read in order to obtain some idea of the difficulties which were encountered, and how they were successfully overcome. The narrative is one of a great achievement, of much self-sacrifice, of skilful organization, creditable to all concerned in the enterprise. The book contains the reproduction of numerous photographs, illustrative of scenes of the work. The value of the assistance of the British and Australian Red Cross is ungrudgingly acknowledged. In looking back upon their experience the authors attribute most of their initial difficulties to a policy of unpreparedness. The organization of the hospitals, they hold, should have been under revision, in peace time. "Our policy for the future," they say, "must be one of scientific organization and calculated preparation in every department."

CRIME AND CRIMINALS: BEING THE JURISPRUDENCE OF CRIME, MEDICAL, BIOLOGICAL, AND PSYCHOLOGICAL. By CHARLES MERCIER, M.D., F.R.C.P., F.R.C.S. With an Introduction by Sir BRYAN DONKIN, M.A., M.D.Oxon., F.R.C.P. Pp. xvii + 291. Price 10s. 6d. net. London: University of London Press, Ltd., 1918.

A book for which the author has received the Swiney Award from the Royal Society of Arts and the Royal College of Physicians, on a second occasion, needs little commendation. In this work, the author, in his usual forceful fashion has arraigned a mass of evidence to prove that, from a medico-jurist's point of view, crime and criminals are the result of the interaction of both internal, individual and external environmental factors; opportunity and circumstances are fundamental but these constitute but a portion of the factors at work. The book is divided into nine chapters, entitled: The Factors of Crime, the Psychology of Crime, the Nature of Crime, Kinds of Crime, Private Crimes, Family and Racial Crimes, Criminals, Kinds of Criminals, and Prevention, Detection and Punishment of Crime. The experience of Dr. Mercier makes him regard the reform of Society as a problem more complicated than one of Laws, Housing and Politics. His views will greatly interest those engaged in psychological and sociological problems.

WHAT IS PSYCHO-ANALYSIS? By ISADOR H. CORIAT, M.D. Pp. 124. Price 3s. 6d. net. London: Kegan Paul, Trench, Trübner and Co., Ltd., 1919.

This is admittedly a popular exposition of psycho-analysis. The print is large and the pages are small, so that the whole might quite easily have been produced in fifty ordinary pages. It is written in the form of questions and answers, the questions having been put or suggested to the author by people in various walks of life, to whom a knowledge of psycho-analytic principles might be useful. The book contains too much information for a prospective patient and too little for a prospective psycho-analyst: yet it touches upon nearly all the most important features and applications of psycho-analysis. We have noted a few errors, but they are unimportant having regard to the class of reader for which the book is intended. Of late we have come across several descriptions of psycho-analysis in articles and books by writers who obviously know nothing about the subject (they are invariably adverse). To such authors we would recommend the perusal of Dr. Coriat's little book. It may not convince them of the truths of psycho-analysis, but it might convince them of their own lack of knowledge. Judging by the subject-matter of the book, the author appears to be a Freudian, but his bibliography is catholic rather than select and does not supply any clue as to the order in which the works it mentions should be studied by the beginner.

ANATOMY, DESCRIPTIVE AND APPLIED. By HENRY GRAY, F.R.S., F.R.C.S. Twentieth edition, edited by ROBERT HOWDEN, M.A., D.Sc., M.B., C.M. Notes on Applied Anatomy revised by A. J. JEX-BLAKE, M.A., M.D.Oxon., F.R.C.P.Lond., and W. FEDDE FEDDEN, M.B., M.S.Lond., F.R.C.S. With 1,168 illustrations of which 520 are coloured; pp. xvi+1324. Price £1 17s. 6d. net. London: Longmans, Green and Co., 1918.

The continued issue of new editions of Gray's Anatomy since 1858, has probably established a record in the history of English medical text-books. From the first it commended itself to the student, and the services of five successive editors, including the author, having been required to keep it up to date. Professor Howden, the present editor, in this, the twentieth edition, has added a new feature by contributing a short biography of the famous author, with a portrait. Henry Gray died at the premature age of 34, from confluent small-pox, and thus at this early age a life of great promise was suddenly cut off. During his short life he gained many honours; when only 25 he was elected a Fellow of the Royal Society. This short biography, full as it is of interesting details of the author's pre-eminence, should be continued as a permanent addition to his work, as further editions are called for. The present issue includes about sixty new illustrations drawn by Mr. Sydney A. Sewell. The Basle terminology is used throughout the text.

MANUAL OF BACTERIOLOGY. By ROBERT MUIR, M.A., M.D., Sc.D., F.R.S., and JAMES RITCHIE, M.A., M.D., F.R.C.P.Ed. Seventh edition. With 200 illustrations in the text and 6 coloured plates; pp. xxiv + 753. Price 16s. net. London: Henry Frowde, Hodder and Stoughton, 1919.

To the seventh edition of this well-known text-book only nine pages have been added, but by the judicious use of small type for matter of less importance, a large amount of new information has been incorporated. The first part of the book dealing with laboratory methods has been brought up to date by the addition of descriptions of new media such as Gordon's trypagar for the meningococcus, Bordet's medium for the whooping-cough bacillus, the author's method of sterilizing blood serum media, &c.; whilst new stains for the spirochæte, &c., are also given. The section on antiseptics contains a concise description of the recent work of Lorrain Smith, Dakin, Daufresne, Browning and others. In the chapters devoted to the various bacteria much new matter has been added. We note, in the case of the pneumococcus, fresh paragraphs on the work of the Rockefeller Institute on anti-serum treatment and the classification of the organism by means of anti-sera; and in the same chapter similar details of Gordon's work on the meningococcus. The account of the coli-typhoid group also includes much of the recent work done during the war on the paratyphoid and dysentery bacilli, the agglutination tests and differentiation of strains, the use of anti-sera, the question of mutation and other new problems. The chapter dealing with the anaërobic bacteria has been largely re-written, and at the same time enlarged, so that it now contains a comprehensive review of this important group. Naturally the largest portion is devoted to the *Bacillus tetanus*, but a number of the less common anaërobic bacteria are also described in some detail. It is to be hoped that bacteriologists will soon arrive at a unanimous decision as to the names of some of these less common anaërobes. At present the variations in nomenclature in different text-books is somewhat confusing. Paragraphs on infective jaundice and rat-bite fever have been added to the account of the spirochætes and an additional appendix inserted on trench fever. Fresh information, together with new illustrations, has also been incorporated with the appendix on amœbic dysentery.

RACE REGENERATION. By E. J. SMITH, Member of National Birth Rate Commission. With 85 plates; pp. xii + 223. Price 7s. 6d. net. London: P. S. King and Son, Ltd., 1918.

The author is the Chairman of the Health Committee of the Bradford Corporation; he has also written another book on maternity and child welfare. The declining birth-rate is discussed in one chapter, and the author's experience on the National Birth Rate Commission lends weight to the opinions expressed in the chapter. The subject of housing is handled in two chapters, and Mr. Smith explains the effects of bad housing on race regeneration. Other subjects discussed are those of Racial Poison, Endowment of Motherhood, Clean Milk Supply, the National Balance Sheet. The Bradford Scheme of Maternity and Child Welfare is given in full and should be perused by those not familiar with it. There are numerous photographic reproductions.

LICE AND THEIR MENACE TO MAN. By Lieutenant LL. LLOYD, R.A.M.C.(T.). With a Chapter on Trench Fever by Major W. BYAM, R.A.M.C. With 13 illustrations; pp. xiii + 136. Price 7s. 6d. net. London: Henry Frowde, Hodder and Stoughton, 1919.

An opportune book, intended for the general reader rather than for a specialist, on a subject that has become of first-class importance during the last four years. The structure, the life history, and habits of the body louse, with its mode of dissemination, are given at length. Several methods of disinfestation are discussed. An important chapter is that containing the results of experiments on the migration of the body louse in fevers. In the chapter on Relapsing Fever references are made to the condition of the second Roumanian army in 1917, and the havoc wrought by lice in the Wittenberg Camp and in Serbia is mentioned in the chapter on Typhus. A chapter on Trench Fever by Major Byam, R.A.M.C., is added.

THE ANATOMY OF THE PERIPHERAL NERVES. By A. MELVILLE PATERSON, M.D., F.R.C.S., Lieutenant-Colonel R.A.M.C. With 64 illustrations; pp. xi + 165. Price 12s. 6d. net. London: Henry Frowde, Hodder and Stoughton, 1919.

The author's object is to provide a brief account of the peripheral nerves for the use of students and surgeons, and particularly for those engaged in military orthopædic work. It gives a concise description of the peripheral nervous system, including its morphology and development, together with topographical and surgical anatomy. It is interesting to notice that the author casts doubts upon the older doctrine of nerve-regeneration, according to which new fibres were supposed to be derived by outgrowth from the axis-cylinders of the central cut end. Colonel Paterson emphasizes the fact that new nerve-fibres can be demonstrated in the distal, as well as in the proximal, portion of a divided nerve. For these and other reasons, he ranges himself with the more modern school, according to which the new axis-cylinders are secreted by the neurilemma cells. The book is fully illustrated.

INTRODUCTION A L'ÉTUDE DE LA MÉDECINE. Par G. H. ROGER, Professor à la Faculté de Médecine de Paris. Sixth edition. Pp. XVI + 795. Price 13fr. 13. Paris: Masson et Cie, 1918.

The author, an experienced physician, teacher and author, has collected the important facts of science bearing on clinical medicine. After an introduction and preliminary notes, physics are dealt with; mechanics, heat, light, sound and electricity. Biology is divided into animal and vegetable parasites and bacteria. Next, main principles of medicine describing the etiology and general pathology of infections are followed by nervous phenomena and nutrition, including auto-intoxication. Embryology is dealt with under the heading of pathology of the fœtus and heredity; here are mentioned experiments dealing with mechanical, physical and chemical agents, acting on eggs to produce monsters. The more essential facts of clinical medicine are discussed under the headings of inflammation, septicæmia and pyæmia, tumours, atrophy and degeneration. Taking as the text, that no disease remains local, or that every disease becomes diffused, functional combinations and morbid sympathies are treated as is possible only by an exponent of the best period of French neurology. Evolution of disease treats of onset, course and terminations. The outlines of clinical medicine deal with examination of patients, new methods of diagnosis, with prognosis. The last chapter is devoted to therapeutics. Each left hand page of the book has a heading to indicate the subject dealt with in the chapter, the heading of the right hand pages show the subject-matter in the separate pages; this method of heading gives little trouble to the printer and materially aids study and reference. The work cannot fail to interest teachers of medicine, and of all sciences associated with medicine; especially those who desire to place themselves and their pupils in a position to appreciate the best of continental science and medicine.

MILITARY MEDICAL MANUALS. General Editors: Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P., and Lieutenant-General T. H. J. C. GOODWIN, C.B., C.M.G., D.S.O. MENTAL DISORDERS OF WAR. By JEAN LÉPINE. Edited, with a Preface, by CHARLES A. MERCIER, F.R.C.S., M.D., F.R.C.P. Pp. xxviii + 215. Price 7s. 6d. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1919.

Dr. Lépine's book is based upon his experience during three years of warfare and with nearly six thousand cases. He has, he states, seen in them symptoms already described and mental types not varying from those met with in ordinary times "but their origin and development are frequently different from those of peace time." In the first place he deals with acute mental disorders—confusional conditions, states of depression, neurasthenia, shell shock, mania, &c. Much stress is laid on the toxic effects of alcohol. It is looked upon as the sole and primary cause in at least a third of the cases he has seen: and, "taking into account those in whom it is only of slight importance, it would appear that half, sometimes close on two-thirds, of our patients have been influenced by alcohol." Much space is given to the consideration of shell shock. Reference is made to those cases of shock which so closely resemble general paralysis of the insane that differential diagnosis "may be impossible, temporarily at least," and in which examination of the cerebro-spinal fluid, with its lymphocytosis and slight albuminosis, increases the uncertainty. In regard to prognosis in shell shock he affirms that it should be extremely guarded and even pessimistic as regards duration, but relatively favourable as to eventual complete recovery. Chronic mental disorders, such as mental debility, chronic confusion, general paralysis of the insane, are discussed. The circumstances of war have had a very distinct accelerative effect in the last-named disease: and the author thinks that this justifies a liberal conception of what is due to general paralytics and their families in all that concerns invaliding and pensions. Special cases are referred to—traumatic cerebral lesions, epilepsy, hysteria, psychasthenia. "There does not seem to be any doubt that the war has produced an increase of epilepsy": but it is more especially the number of fits rather than the number of cases. The fits, too, are of a more severe type. In the second part the author deals with the practical application of expert knowledge to the questions which arise from mental disorder. Simulation has been uncommon. "Those who will insist in seeing a malingerer in every mental case would be making a very silly blunder." A description of some of the crimes committed is given and the duty of the psychiatric expert in respect to these is outlined. The desiderata in regard to hospital accommodation, personnel, and general treatment are described: also such matters as length of leave, discharges from the service, pensions and gratuities. In conclusion, Dr. Lépine states that the total amount of mental disorder has been by no means disproportionate to the strain and the stress to which the men have been subjected. "Neither in the hell at Verdun nor elsewhere have there been any mental epidemics, either through fear or through horror."

ANIMAL PARASITES AND HUMAN DISEASE. By ASA C. CHANDLER, M.S., Ph.D., Instructor in Zoölogy, Oregon Agricultural College. With numerous illustrations; pp. xiii + 570. Price 21s. net. New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1918.

This volume is compiled particularly for the benefit of those who, while not specialists in parasitology, are yet practically interested in the subject of the prevention of human diseases due to animal parasites. Scientific terms are avoided as far as possible, and it is written in such a style that it can be easily read and understood by public health and immigration service officers, teachers of hygiene and domestic science, students, farmers, &c. It is divided into three parts, dealing respectively with Protozoa, "Worms," and Arthropods. In the first of these, the parasites of syphilis, malaria, sleeping sickness, dysentery, &c., are described, and the symptoms and treatment of each of these diseases are briefly considered. Of the worms, the flukes, tapeworms, and hookworms, receive the most attention; the manner of infection with, and the preventive measures against these organisms, being adequately dealt with. In the last part the author gives a comprehensive account of insects, in their dual rôle of pests and carriers of disease. The habits and relationship to disease of mites, ticks, bugs, lice, fleas, mosquitoes, &c., are explained, and the most up-to-date methods for destroying their breeding places, and measures for individual prophylaxis are pointed out. The local treatment of the various insect bites, and the general treatment of the infective diseases to which they may give rise, are also described. A noticeable feature of the work is the omission of controversial problems, the inclusion of which would only serve to confuse the *practical* reader.

THYROID AND THYMUS. By ANDRÉ CROTTI, M.D., F.A.C.S., LL.D. With 96 illustrations and 33 plates in colours; pp. xix + 567. Price $10.00. Philadelphia and New York: Lea and Febiger, 1918.

The anatomy, histology and embryology of the thyroid and thymus glands are described and figured by the author who was formerly a pupil of Professor Stilling, of Lausanne, and Professor Kocher, of Berne: a synoptic table of tumours of branchial origin has also been drawn up. A distinction must be made between the functions of the thyroid and parathyroid glands, though Gley considers their functions are inter-related, as removal of the thyroid causes myxœdema and removal of the parathyroids tetany. In thyroidectomy the onset of myxœdema may be prevented if one-eighth of the gland be left. Not even one parathyroid should ever be removed or its blood-supply interfered with. Tetany should be treated by the administration of parathyroid and of calcium lactate. Iodine, arsenic, phosphorus, and certain lipoids appear to be the most important chemicals in the thyroid secretion. Experimental thyroidectomy is followed by hypertrophy of the *pars intermedia* of the pituitary; the same condition is found in myxœdema.[1] The hypertrophied tissue shows vesicles containing colloid like that of the thyroid but without iodine content, and pituitary extract is of no value in treating myxœdema. A new parasite, discovered by Chagas, of Brazil, which is transmitted by the bite of an insect, often causes severe thyroiditis which may be followed by goitre; it is thus probable that other forms of goitre are caused by a yet unidentified parasite. Embryology plays an important part in the pathology of the tumours of the thyroid; they are classified partly according to the embryological, and partly according to the clinical, aspect. Goitres becoming malignant arise from simple goitre in 90 per cent. of the cases, and the change to the malignant condition often takes place in women about the time of the menopause: early operation is essential. The close association between endemic goitre, cretinism, myxœdema and cachexia strumipriva is pointed out, and the history of successive discoveries related, commencing with Sir William Gull's paper published in 1874.[2] The connexion between endemic goitre and water-supply has been known for centuries: the river Struma, in the Balkans, was so called from the occurrence of goitre among those dwelling along its banks. The onset of goitre after drinking the water has no connexion with the geological formation of the district, nor with any inorganic salts contained in the water; it is due to an infective material, so far unidentified, which has contaminated the water. One curious instance of this kind of infection is recorded in the case of those members of the crew of a ship commanded by Captain Cook who became affected with goitre after drinking water derived from an iceberg. McCarrison has recorded several instances of water-borne infection. If one cannot leave the neighbourhood thus infected, boiling the water is the best prophylactic. The medical treatment of goitre consists in the external application or internal administration of iodine. X-rays have no effect on simple goitre. Operative treatment must be undertaken if medical measures fail. Graves's disease is fully discussed; the causation of the ocular symptoms, of the tremors and muscular weakness of the nervous and emotional symptoms and of the alimentary disturbances is explained. Glycosuria is common and diabetes occurs in about 3 per cent. of the cases. The ætiology of Graves's disease is still a matter of speculation but there is reason to think that some of the cases are primarily of nervous origin. There is no specific medical treatment of exophthalmic goitre; the administration of thyroid extract only makes the patient worse. Operation, undertaken to relieve the pressure of an enlarged thyroid, was found to relieve the other symptoms as well; this led to its general adoption. About 20 per cent. of the cases die when treated medically; the mortality after operation skilfully done may be *nil* as in the author's last series of 137 cases. Dr. Crotti prefers general to local anæsthesia when operating. A subcutaneous injection of 1 gr. of pantopon and $\frac{1}{500}$ gr. of scopolamine are given before operation. A light ether anæsthesia is generally induced as well. In cases of shock after operation blood transfusion is carried out by the author's indirect method. Resection of the front part of both thyroid lobes and of the isthmus is the operation of choice. The X-ray treatment of Graves's disease is not recommended. Lastly, the diseases of the thymus gland are discussed. Excision of the thyroid causes hypertrophy of the thymus and vice versâ. The thymus is enlarged in about 80 per cent. of cases of Graves's disease. In one case of Graves's disease in which operation on the thyroid had failed, subsequent excision of the thymus cured the patient. The author's results have shown further improvement since he has combined removal of part of the thymus with a thyroid operation.

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[1] *See* F. W. Mott, F.R.S. "Changes in the Central Nervous System in Hypothyroidism." *Proceedings*, 1917, x (Sect. Path.), p. 51.

[2] *Trans. Clin. Soc. Lond.*, 1874, vii, p. 180.

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SUPPLEMENT

(Vol. XII, No. 9, August, 1919).

NOTES ON BOOKS.

[*The purpose of these "Notes" is not so much to praise or to blame as to draw attention to and describe some of the new books and new editions which have been added to the Society's Library.*—Ed.]

Surgical Aspects of Typhoid and Paratyphoid Fevers. Founded on the Hunterian Lecture for 1917. Amplified and Revised, by A. E. Webb-Johnson, D.S.O., M.B., Ch.B.Vict., F.R.C.S.Eng., Temporary Colonel, A.M.S. With plates and other illustrations; pp. 190. Price 10s. 6d. net. London: Henry Frowde, Hodder and Stoughton, 1919.

The opening chapter is devoted to a brief survey of the history of the surgical complications of typhoid, illustrated with portraits of men, from Willis to W. W. Keen, who have conspicuously contributed to our knowledge of them. This is followed by a general survey of the field containing a tabulated list of the frequency of the chief complications in inoculated and uninoculated subjects. The remainder of the book deals in successive chapters with the complications of the various systems—e.g., alimentary tract, spleen, joints, &c., in greater detail. The final chapter is devoted to the "carrier" problem in which the rôle of the spleen is especially emphasized.

Equilibrium and Vertigo. By Isaac H. Jones, M.A., M.D., Major, M.R.C., United States Army. With an Analysis of Pathologic Cases by Lewis Fisher, M.D. With 130 illustrations; pp. xv + 444. Price 21s. net. Philadelphia and London: J. B. Lippincott Co., 1918.

The writer insists on the importance of the study of disturbances of equilibrium to the physician, the ophthalmologist and the neurologist, though primarily to the otologist. He demonstrates the value of the "labyrinth" tests (as practised by the otologist) in the diagnosis of diseases of the nervous system, by means of a large number of actual cases in which the tests were carried out on a plan which combines completeness with comparative simplicity. A special chapter is devoted to the consideration of the ear in relation to aviation, showing how the rotation tests quickly separate the obviously fit from the unfit without resorting to the caloric test which is reserved for the doubtful cases. The author claims for the vestibular tests considerable value in the diagnosis of syphilis in the early, the active and the latent stages, as also in the decision as to the efficiency of treatment. As an indication of the value to the neurologist, "fourteen points" are set out indicating a central nervous lesion, and four a peripheral one. These are well illustrated in some of the actual cases. The reader of these will agree in the main that "no operation upon the brain should be undertaken without giving the patient the benefit of an ear examination" (p. 61). This applies most particularly to cases of suspected cerebellar and cerebello-pontile angle lesions. The positions of the head for bringing the various canals into vertical and horizontal planes as required are illustrated with unusual clearness. The tests which depend upon the induction of nystagmus, vertigo and past-pointing are set forth in great detail both as regards the methods of carrying them out and the inferences to be drawn from the results. Much of the difficulty connected with them is removed by the insistence on the acceptation of past-pointing as a manifestation of the vertigo. Great care is taken to make it clear when the slow vestibular drag is referred to and when the quick cerebral twitch, but, even with all this, confusion is apt to arise in the mind of the reader unless he exercises considerable concentration and alertness. Thus on p. 152 the statement that "the eyes are always drawn in the direction of the endolymph movement" does not refer to what is usually accepted as the direction of the nystagmus but to the slow component, as indicated in parenthesis on p. 149 by the words "we will discuss only the vestibular or slow component." Nystagmus and after-nystagmus induced by rotation have also to be carefully distinguished (p. 150). With such precautions the reader should be able to acquire a clear idea of the theory as well as the practice of vestibular testing. Every means of illustration is employed, including stereoscopic photographs of the anatomical structures, cinematographic films of the manipulations required, charts for the registration of the results of tests, and blank diagrams in which to indicate the locality and size of any supposed lesion. This is probably the very latest statement on the subject and if it may be suggested that it might have been uttered in a shorter and more condensed form, we can only say that whoever reads it for the first time will derive much benefit from the repetition, recapitulation, elaboration and summarizing. The reader who goes through the book for the second time will be able to do the abbreviating and condensing for himself.

DISPENSARIES: THEIR MANAGEMENT AND DEVELOPMENT. A Book for Administrators, Public Health Workers, and all interested in better Medical Service for the People. By MICHAEL M. DAVIS, junr., Ph.D., and ANDREW R. WARNER, M.D. Pp. ix + 438. Price $2.25. New York: The Macmillan Co., 1918.

The authors trace the developments of dispensaries from the first one established in the buildings of the Royal College of Physicians, London, after the Great Fire in 1666 to their present scope in the United States. In the book will be found details of the construction of dispensaries, their management, the type of patients who should attend, and the organization of these clinics, medical and administrative. There are copies of a series of elaborate records and statistics, and "follow-up" systems are explained. In view of the setting up of the Ministry of Health in this country, and the recent utterances of medical politicians, it is a book that can be read with profit and interest; though the systems detailed in the book are not in favour with the bulk of medical opinion in this country.

DISEASES OF THE SKIN. By JAMES H. SEQUEIRA, M.D.Lond., F.R.C.P.Lond., F.R.C.S.Eng. Third edition. With 52 plates in colour and 257 text-figures; pp. xiv + 644. Price 36s. net. London: J. and A. Churchill, 1919.

The publication of the third edition of any leading medical text-book is calculated to raise its value both in the estimation of the author and the profession. This has certainly bee done in the new issue of Dr. Sequeira's "Diseases of the Skin," first published in 1911. The volume appears in its original form, but, by re-arrangement and the use of fresh types, has not been increased in size. Numerous sections have been re-written and by a genera revision the whole work has been brought up to date. The additional coloured plates include dermatitis herpetiformis, eczematoid ringworm of the extremities, necrotic tuberculides, and trench-foot, besides a number of new text-figures in black-and-white. Chapter XI contains sixty-two pages on syphilis, with a concise description of modern treatment, and is numerously illustrated with coloured plates and text-figures. Brief descriptions are also added of myringomycosis, trench-foot, and the cutaneous lesions caused by high explosives (a list of which is included with notes), gas dermatitis and gangrene. The appendices contain practical information on the important subject of treatment which will prove of much value to the practitioner and student, and the index is complete and well typed. We congratulate the author upon the continued success of his work.

A LIST OF SOME OF THE OLD MASTERS OF MEDICINE AND SURGERY, TOGETHER WITH BOOKS ON THE HISTORY OF MEDICINE AND ON MEDICAL BIOGRAPHY, IN THE POSSESSION OF LEWIS STEPHEN PILCHER. With Biographical and Bibliographical Notes, and Reproductions of some Title Pages and Captions. Pp. vii + 201. Brooklyn, New York: (privately printed), 1918.

Of this interesting and attractively produced volume 250 copies are issued, the one presented to this Society being number two. This catalogue raisonné is divided into two parts, namely (*a*) special lists, such as incunabula, of which there are fourteen, Mundinus and the Pre-Vesalian anatomists, Ambrose Paré, William Harvey and Sir Thomas Browne; and (*b*) general lists, namely, bibliographical, biographical, historical, anatomical, surgical and medical. Among the works catalogued under the heading of "The Medical Life" is a copy of the proceedings and addresses at the reception and banquet in honour of this veteran bibliophil on the completion of his services of fifty years as a Doctor of Medicine, on May 16, 1916, and among the well-chosen modern works there are Conan Doyle's "Round the Red Lamp"; and Osler's "Æquanimitas"; and Stephen Paget's "Confessio Medici." The author's book-plate, like the other illustrations, has been well executed, and the volume contains much information in the condensed notes.

THE MEDICAL AND SURGICAL ASPECTS OF AVIATION. By H. GRAEME ANDERSON, M.B., Ch.B., F.R.C.S., Surgeon-Lieutenant R.N. With Chapters on "Applied Physiology of Aviation," by MARTIN FLACK, M.A., M.B., Lieutenant-Colonel R.A.F., and "The Aero-Neuroses of War Pilots," by OLIVER H. GOTCH, M.B., Ch.B., M.R.C.P.Lond., Surgeon-Lieutenant R.N., and an Introduction by the Right Hon. the Lord WEIR OF EASTWOOD, P.C. With 27 plates and 20 text illustrations; pp. xvi + 255. Price 12s. 6d. London: Henry Frowde, Hodder and Stoughton, 1919.

The science of aviation has already been productive of many books but this is the first one we have met with which deals fully with its medical and surgical aspects. The author is able to write from his personal experience in dealing with flying men, and he has as collaborators Lieutenant-Colonel Martin Flack, who writes on the applied physiology of aviation, and of Surgeon-Lieutenant Oliver H. Gotch, who writes on the aero-neurosis of war pilots. After an historical introduction, the author proceeds to deal with the medical selection of candidates, and the standards and tests which have been gradually evolved by the authorities of the Royal Air Force. The previous health and habits and occupation are carefully inquired into, and various tests, physiological and psychical, are employed. The psychology of flying is dealt with in an interesting chapter. This subject is considered first, when the pupil is undergoing his dual-control training, secondly during his first few solo flights, and thirdly, when he is a qualified aviator engaged in war flying or instructing. The ideal flying temperament, as it has been called, is not easily determined by any form of examination before actual flying experience. In his own practice the author laid down the rule that "as soon as a pupil showed loss of confidence in flying and exhibited any of the signs or symptoms of aero-neurosis he must be discharged from the air station as unfit for further flying." We are convinced that the experience of medical boards and hospitals would strongly support this decision. The purely surgical section of the book opens with a series of photographs showing the results of aeroplane accidents, which are of surpassing interest. The chief causes of accidents and the methods to be adopted for preventing them are discussed. The surgery of aviation as contrasted with that in civil life differs in this, that in that of aviation, one is called on mostly to deal with the results of high velocity accidents associated with falls at varying angles and from varying heights.

INFECTION AND RESISTANCE; AN EXPOSITION OF THE BIOLOGICAL PHENOMENA UNDERLYING THE OCCURRENCE OF INFECTION AND THE RECOVERY OF THE ANIMAL BODY FROM INFECTIOUS DISEASE. By HANS ZINSSER, M.D. With a Chapter on "Colloids and Colloidal Reactions," by Professor STEWART W. YOUNG. Second edition, revised. Pp. xiii + 585. Price $4.25. New York: The Macmillan Co., 1918.

The second edition of this book contains an account of new work to the extent of some forty pages of text. Whilst making numerous alterations on important subjects such as Abderhalden's serum reaction on which opinion has changed very considerably, the author has endeavoured to retain his original aim of presenting to the reader the "fundamental principles underlying the biology of infectious diseases" rather than compiling a practical clinical laboratory handbook. The chapters on anaphylaxis have been largely re-written in order to include new work. Unfortunately it is almost impossible to keep text-books up to date on this subject, and although the index contains over four pages of references it is still not quite complete. Nevertheless this section of the work is a comprehensive survey on a subject to which American authors have paid great attention during the last few years. In dealing with the vexed question of the part played by complement in immune processes the author gives full information as to recent theories. The chapter on immunization in man has also been much enlarged. It now contains a section on poliomyelitis, which includes an account of the recent researches of Flexner and Noguchi, and an extensive section on syphilis. The latter deals at considerable length with the various difficult problems of antibody reaction in man and in animals, and includes a *resumé* of the author's work on the subject. The lack of cellular reaction in syphilis, or, as Zinsser expresses it, the "tissue indifference," receives special consideration. The chapter on serum enzymes has been revised. The author now believes that Abderhalden's reaction is entirely "a non-specific enzyme activity of normal serum."

PSYCHO-ANALYSIS AND ITS PLACE IN LIFE. By M. K. BRADBY. Pp. xi + 266. Price 8s. 6d. net. London: Henry Frowde, Hodder and Stoughton, 1919.

This is a clear and concise account of psycho-analysis, written for "the ordinary educated man or woman who has begun to study psycho-analysis and is puzzled," but it is quite as well suited to those who have never studied the subject at all. The chapters are arranged in six groups: (1) The unconscious mind, (2) some psycho-analytic theories, (3) dreams, (4) unconscious primitive traits in present-day thought, (5) place of psycho-analysis in life, and (6) light on biography from psycho-analysis. The author does not lay sufficient stress on the importance of infantile experience for the subsequent psychology of unconscious thought, and therein falls short of a complete acceptance of Freud's doctrines. On the other hand, she sees quite clearly the weakness of Jung's hypotheses. The result is that her analysis of dreams and personalities does not penetrate deeply enough from either point of view. It is in the very nature of true psycho-analysis that it arouses opposition and resentment in everybody who is not prepared to face its unpleasant home truths, but we doubt whether anybody will object to psycho-analysis as expounded in "Psycho-analysis and its Place in Life." For this reason it may be strongly recommended to those who know nothing about the subject.

WAR NEUROSES AND SHELL SHOCK. By FREDK. W. MOTT, M.D., LL.D., F.R.S., F.R.C.P., Brevet Lieutenant-Colonel, R.A.M.C.(T.). With Preface by the Right Hon. CHRISTOPHER ADDISON, M.P. With 3 coloured plates and 93 other illustrations; pp. xx + 348. Price 16s. net. London: Henry Frowde, Hodder and Stoughton, 1919.

This work comprises much that has been published before in the author's "Lettsomian Lectures" and other communications, but it also contains the product of later years' observation at the Maudsley Hospital. It is not to be wondered at that riper experience has led Sir Frederick Mott to recognize that the psychogenic factor is the predominant causal agent in the production of the war psychoneuroses, and that the cases of shell shock due to any pathological changes in the central nervous system were relatively infrequent. His opening pages deal with the effect of shock upon the neuron and the causation of instantaneous death from high explosive action, with a discussion on the signs and symptoms of commotional shock with its consecutive phenomena. Various possible emotional and abnormal mental states that may follow shock are dealt with, such as different forms of mental confusion, amnesias and speech defects, illustrative cases being quoted. It is shown how important is a neuropathic tendency for the development of these war neuroses, and the sufferers' dreams in their various relations are mentioned. The author credits MacCurdy with the term "conversion hysteria," whereas it was coined by Freud long ago. Nearly a hundred pages are then devoted to the hysterical signs and symptoms mainly met with, the differential diagnosis of functional from organic disease, with a short summary of neurasthenic states. Notwithstanding the title of the book a few pages are devoted to the psychoses, among which "psychasthenia" is for some reason included. In such a space only a few bald statements can palpably be made concerning them. An error here must be noted (p. 200)—viz., that 20 per cent. of the mental cases admitted to "D" Block, Netley, were sent on to neurological hospitals. During the years 1917 and 1918 only just over 2 per cent. were so transferred. Malingering and the relation of alcohol to the war neuroses are briefly spoken of, while the concluding part of the book is devoted to carbon monoxide poisoning and the treatment of the various neurotic states. A bibliography and an appendix on the examination of nervous Service patients are added. The Right Hon. C. Addison, M.P., introduces the work in a short preface. The inclusion of 93 illustrations and some coloured plates enhances its value.

THE NEWER KNOWLEDGE OF NUTRITION: THE USE OF FOOD FOR THE PRESERVATION OF VITALITY AND HEALTH. By E. V. McCOLLUM, School of Hygiene and Public Health, Johns Hopkins University. With illustrations; pp. ix + 199. Price $1.50. New York: The Macmillan Co., 1919.

The contention of the writer of this book is "that the biological method for the analysis of single foodstuffs and mixtures of foodstuffs has made it evident that the former practice of regarding protein, energy and digestibility as the criterion of the value of a food mixture, must be replaced by a new method based upon a biological classification of the foodstuffs, the latter having its foundation in the function of the substance employed in the diet." The book is devoted to maintaining this thesis, and describes the results of feeding animals on different mixtures of foodstuffs and their effects on health and vitality. Considerable attention is also given to the "deficiency" diseases, and the proposition is advanced that there are only two unidentified dietary essentials—fat-soluble (*a*) and water-soluble (*b*). The former prevents the development of a pathological condition of the eyes (xerophthalmia), the latter of beri-beri. Many of the diseases believed to be due to "vitamine" starvation—e.g., scurvy—are probably to be attributed to other causes. The "unidentified essentials" are abundantly present in milk and green vegetables, which may be spoken of as "protective foods." Practical considerations which should guide us in the planning of the diet in view of biological results are considered in the final chapter. A full bibliography and a short index are appended.

CEREBRO-SPINAL FEVER: THE ETIOLOGY, SYMPTOMATOLOGY, DIAGNOSIS AND TREATMENT OF EPIDEMIC CEREBRO-SPINAL MENINGITIS. By C. WORSTER-DROUGHT, B.A., M.B., Captain (Temp.), R.A.M.C., and ALEX. MILLS KENNEDY, M.D., Captain, late R.A.M.C. With 8 full-page plates and 56 other illustrations; pp. 528. Price 30s. net. London: A. and C. Black, 1919.

This work embodies the experience gained at the Herbert Military Hospital, Woolwich, during three years by a neurologist and a bacteriologist, and also contains a review of current work with a full bibliography. There are twenty chapters which cover the whole subject. After some general observations on the geographical distribution, seasonal prevalence, age and sex incidence, a chapter is devoted to the bacteriology dealing with the meningococcus and allied organisms. Full recognition is given to the publications of the Medical

Research Committee, and especially to Gordon's work; out of 183 strains of meningococci tested by his agglutinating serums 50 belonged to type I, 97 to type II, 22 to type III, and 11 to type IV. The dissemination of the disease and the part played by "carriers" is fully considered, and many statistics brought forward. As regards the disposing causes the author's observations are to the effect that there is not any obvious relation between low atmospheric temperatures and the incidence of the disease, but that there appears to be some connexion between a diminished rainfall and an increased case incidence. A short incubation period is regarded as probable, and the view is taken that the meningococcus first enters the blood stream and is usually thus carried to the meninges within a few hours without causing a real septicæmia. The full account of the symptoms is illustrated by figures, particularly of facial herpes, and numerous temperature charts. From their experience it appears that there is some degree of limitation in flexion of the head before Kernig's sign is at all definite, and that the knee- and ankle-jerks are not of any diagnostic value, being of academic interest only. The influence of a rash on prognosis is shown by a mortality of 44 per cent. among those with a petechial eruption as compared with 18 per cent. in cases without a rash. In the systematic account of the complications evidence is brought forward to show that nephritis, which has hitherto received little attention in this connexion, may occur. The important subject of treatment is discussed in practical detail; if a case is seen in the pre-meningitic stage and the cerebro-spinal fluid is clear, serum should be given intravenously or intramuscularly. The minimum period for the administration of serum intrathecally, no matter how great the improvement in the patient's condition may be, and this is often striking on the second or third day, is four days, and on no account should the injections be omitted while the cerebro-spinal fluid contains meningococci. An interesting account is given of the manifestations of serum disease, and the concluding chapter on sequelæ shows that contrary to popular supposition serious after-results have become considerably less frequent than in the past.

Précis de Radiodiagnostic Technique et Clinique. Par le Dr. Jaugéas. Préface de M. le Dr. Béclère. Second edition. With 63 plates and 220 other illustrations; pp. xxviii + 563. Price 22fr. net. Paris: Masson et Cie, 1919.

The title of this work very well describes it: it deals with the whole subject of radiodiagnosis. There is an introduction of considerable length by Dr. Béclère, in which he insists that, in order to be an efficient X-ray diagnostician, a man must possess a clinical knowledge as well as a high degree of technical skill. A feature of the book is that normal skiagrams of all parts of the body are shown. Illustrations are liberally dispersed throughout the book, and are in the form of reproductions of prints, not of negatives. Radiodiagnosis of the chest and abdomen are very fully dealt with, about 130 out of a total of 544 pages being devoted to this section. The description of apparatus and of the organs of the body occupies about the same space: the instruments dealt with are almost all of French manufacture.

The Early Diagnosis of Tubercle. By Clive Riviere, M.D., F.R.C.P. Second edition. With 35 illustrations; pp. xiv + 314. Price 10s. 6d. net. London: Henry Frowde, Hodder and Stoughton, 1919.

In this second edition, which has been called for after an interval of five years, whole sections, especially those devoted to physical signs, have been practically re-written, others have been much augmented, and the account, based on personal experiences, of hilus tuberculosis in the adult is expanded from two to twenty pages. This term is applied to disease starting in the deep part of the lung around its roots; it tends to spread outwards along the bronchi and vessels in a fan-shaped manner and bilaterally. In contrast to the apical crepitations of ordinary pulmonary tuberculosis, the earliest signs may appear at almost any point in the chest, often at the base behind, or the middle of the upper lobe in front, or in the axilla. Its bilateral character is generally shown in two ways, equality of movement on the two sides, and double apical contraction, as shown by measurements of Krönig's areas, "the sign-manual of hilus tuberculosis," for without evidence derived from this source it is often impossible to detect the lesion in any but its latest stage. Krönig's areas of apical resonance, which the author has been accustomed for years to mark out as a routine practice in all cases of pulmonary disease, are illustrated by four diagrams. The work is divided into two parts, dealing with tuberculosis of the lungs in adults and in children respectively. "The reflex bands of dullness, the author's sign in pulmonary tuberculosis," are illustrated and explained; gentle percussion of the back of a patient with pulmonary tuberculosis at whatever stage, reveals bands of slight impairment at the apices and across the lower scapular regions on both sides, though better marked on the diseased side. These bands of impairment, though normally absent in a healthy chest, can be produced by the methods that bring out Albert Abrams' "lung reflex of contraction." In the section on examination for tubercle bacilli the author insists that it is disastrous to wait for the presence of tubercle bacilli in the sputum before making the diagnosis, and that before the sputum can with certainty be said to be free from tubercle bacilli Much's granules must be looked for. Diagnosis by means of tuberculin tests is described in fuller detail, and clear indications of the value and limitation of the tests are given.

A VISION OF THE POSSIBLE: WHAT THE R.A.M.C. MIGHT BECOME. An Account of some of the Medical Work in Egypt; together with a Constructive Criticism of the R.A.M.C. By JAMES W. BARRETT, K.B.E., C.B., C.M.G., M.D., M.S., F.R.C.S.Eng., Temporary Lieutenant-Colonel, R.A.M.C. Pp. xx + 182. Price 9s. net. London: H. K. Lewis and Co., Ltd., 1919.

This book will be read with interest, if not with grim satisfaction, by every medical officer who has served with the R.A.M.C. Its mere publication indicates that the authorities are alive to the criticisms which it contains, offered in no destructive spirit, but with the earnest desire to see the Royal Army Medical Corps elevated to the status of a *corps d'élite*. It is not a little significant that its appearance coincides with the appointment, by the War Office, of directors, assistant directors, and deputy directors of hygiene and pathology. With these as a nucleus it should not be difficult to group around them men of high professional attainments, selected from the vast number of medical men who are by now conversant with Army requirements, and thus organize a headquarters staff in medical science of the utmost efficiency. The author hints at the sterilizing influence of administrative work upon medical officers, who find that the only road to promotion runs through an office and not through the clinical wards and laboratory. He suggests that the field of specialism is too often controlled by officers in the higher ranks of the R.A.M.C. who are wholly out of touch with "the drift of modern thought." Most medical men who held temporary commissions in the R.A.M.C. will confirm the author's statements from their own experience, and it is a hopeful sign that "the powers that be" did not censor a book which deals largely with their own shortcomings. Apart from questions affecting the organization of the corps, there is a section in which the treatment of diseases of the ear, nose and throat is discussed, and the author shows how simple precautions in chronic otorrhœa can prevent a great deal of man-wastage. The work of medical boards is analysed, and there is an important chapter on the management of venereal disease, and the prophylactic measures adopted at Port Said. Sir James Barrett in the past has shown his keen interest in matters of education and reform, and this, his most recent work, deserves serious study by all who are concerned with the welfare of the R.A.M.C.

RECHERCHES RÉCENTES SUR LES ICTÈRES—LES RÉTENTIONS BILIAIRES—PAR INSUFFISANCE HÉPATIQUE. Par M. BRULÉ, Chef de Laboratoire á la Faculté de Médecine de Paris. Pp. ix + 182. Price 4 fr. 95. Paris: Masson et Cie, 1919.

In this review of the recent work done by the author and his colleagues the predominating idea is that in the large group of cases of jaundice occurring in connexion with infective and toxic conditions there is not any obstruction in the small intrahepatic bile canaliculi, but that the jaundice is due to disordered function of the hepatic cells which show definite histological changes. In support of this contention appeal is mainly made to the phenomena of dissociated jaundice, which is described in full detail and with many examples. In cases of gross obstruction of the large bile ducts there is "complete" jaundice, both the bilirubin and the bile salts entering the circulation and passing into the urine; in infective and toxic jaundice, on the other hand, the bile pigments alone may enter the blood and appear in the urine, while the bile salts still pass into the intestine and so do not appear in the urine; in some cases without jaundice, for example in cirrhosis, bile salts alone are present in the urine; this is dissociated jaundice and has been produced by the injection of hepatic cytolytic serum. The important deduction is drawn that, as the selective secretion into the circulation, instead of into the bile canaliculi, of bilirubin or of bile salts can be performed by the hepatic cells only, the detection of dissociated jaundice in any given case is incompatible with the view that the jaundice is due to obstruction. An interesting comparison is drawn between hepatic and renal pathology as regards lesions of the excretory ducts on the one hand and of the secretory cells on the other hand; gross mechanical jaundice, such as that caused by cancer of the head of the pancreas, corresponds to obstructive anuria such as results from compression of the ureters by malignant disease of the uterus, whereas dissociated jaundice due to lesions of the hepatic cells is comparable to the retention of urea or chlorides in parenchymatous nephritis. From numerous investigations which show the frequency of dissociated jaundice, the obstructive origin of jaundice is minimized and the part played by functional disorder of the hepatic cells emphasized; thus what is commonly called catarrhal jaundice due to obstruction of the lower end of the common bile duct is claimed as the result of changes in the hepatic cells. Jaundice may be caused by three processes—namely, gross obstruction of the ducts, functional disorder of the liver cells, and independently of the liver by the transformation of free hæmoglobin into bilirubin. The last form, hæmolytic jaundice, is described in a separate chapter.

MILITARY MEDICAL MANUALS. General Editors: Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P., and Lieutenant-General T. H. GOODWIN, C.B., C.M.G., D.S.O. ELECTRO-DIAGNOSIS IN WAR: CLINICAL, MEDICAL BOARD TECHNIQUE AND INTERPRETATION. By A. ZIMMERN and PIERRE PEROL. Edited with a Preface, by E. P. CUMBERBATCH, M.A., M.R.C.P., B.M.Oxon. With 44 illustrations; pp. xxiv + 212. Price 7s. 6d. net. London: University of London Press, Ltd., 1918.

Chapter I begins with a *résumé* of various forms of apparatus and their use, and then gives an account of the normal reactions of nerves and muscles to electrical stimulation and the technique employed to elicit them. The latter part of the chapter is a condensed description, with diagrams, of the more important nerve distribution and motor points. Care is taken to avoid any overcrowding of detail, and it is pointed out that the various motor points are somewhat inconstant and vary with the individual. Chapter II describes the various abnormal reactions and conditions in which they occur. Attention is drawn to the special pitfalls in the examination and the liability of misinterpreting the meaning or cause of a particular reaction. The reaction of degeneration in its various stages is fully described, its theory and clinical significance. One section of the chapter emphasizes the need for adopting a uniform technique in electro-diagnosis. There is a brief description of the technique and advantages of electro-diagnosis obtained with condensers of variable capacity and variable charges. The chapter concludes with a section on chronaxy. It is insisted upon that the condition of nerves and muscles cannot be properly gauged without consideration of the time factor in addition to the intensity of the current. Means of time measurement are described and discussed together with the significance of the results obtained. Chapter III deals with motor paralyses, their occurrence, differential diagnosis, and course. Attention is drawn to apparent discrepancies which may occur, and to some special peculiarities of certain nerves. The second half discusses lesions of the cord, combined functional and organic disorders and the reflex paralyses and contractures. Chapter IV gives a short account of sensory disturbances, and methods of distinguishing between organic and functional disorders of sensation. It is shown that sensory changes may be of great assistance in localizing lesions in the brain and cord. Chapter V describes the relation of voltaic vertigo to various head injuries, the different phenomena encountered and their significance. Chapter VI points out the value of a careful and complete electro-diagnosis and the need for so examining patients before judgment is passed by a medical board. The whole volume is, as Sir Alfred Keogh says of the Series, "marked not only by a wealth of detail but by clearness of view and logical sequence of thought."

PSYCHOLOGICAL PRINCIPLES. By JAMES WARD, Sc.D.Cantab., Hon. LL.D.Ed., Hon. D.Sc.Lond. Pp. xvi + 478. Price 21s. net. Cambridge: Cambridge University Press, 1918.

This book is an expansion of the article on the same subject contributed by the author to the tenth edition of the "Encyclopædia Britannica." The first chapter deals with the definition of psychology, consideration being given to the views of Aristotle, Descartes, Kant and others. Subsequent chapters deal with the theory of attention, the theory of presentations, perception, imagination or ideation, feeling, intellection and conduct. It will be seen from this list of the contents that the author approaches psychology on the classic lines, and his book will not appeal strongly to medical men as such. Professor Ward's attitude to recent medical work in this sphere is indicated by the following extract from his preface: "But there is a psychology which arrogates to itself the title of 'new.' New it undoubtedly is, and there are signs that in its present form it will not long survive. In any case it is not psychology—save in so far as it occasionally furnished the psychologist with material of some value. As a *method* in the hands of psychologists it has done some good: as a pretended *science* in the hands of tyros whose psychological training has not even begun, it has done infinite harm."

SIR WILLIAM TURNER, K.C.B., F.R.S., PROFESSOR OF ANATOMY AND PRINCIPAL AND VICE-CHANCELLOR OF THE UNIVERSITY OF EDINBURGH: A CHAPTER IN MEDICAL HISTORY. By A. LOGAN TURNER, M.D. With 7 portraits; pp. xviii + 514. Price 18s. net. Edinburgh and London: William Blackwood and Sons, 1919.

One of the truly great biographies of the year, this book sketches the main incidents in the life of one of the great heads of the profession, whose sixty-two years of devoted service have left an indelible impression for good upon all who came within the sphere of his influence. From the earliest days of his apprenticeship to Christopher Johnson, junr., his scientific bent was recognized and fostered in the chemical classes he attended in the Mechanics' Institute in Lancaster. At the age of 16 Turner was made a Freeman of the City, and when his term of apprenticeship was up he entered the medical school of St. Bartholomew's, where he came under the influence and teaching of Paget. He qualified as M.R.C.S.Eng. in 1853. The following year he accepted the appointment, which had been offered to him by Professor John Goodsir, of Demonstrator of Anatomy in the University of Edinburgh. His acquaintance, which afterwards ripened into a friendship, with Lister began in 1855, and his relationship with his contemporaries was of the happiest. Turner's success as a teacher was assured from the first, and in 1857 he published his atlas and handbook on "Human Anatomy and Physiology," which was later translated into Arabic. In the same year he took the M.B.Lond. His marriage with Agnes Logan took place in 1863, and upon the death of Goodsir four years later he was elected Professor of Anatomy at the age of 35. He looked upon the pursuit of anatomical knowledge by the medical student as of prime importance, because by the study of this science "the habit of observation is cultivated in order to see truly and completely the objects to be examined." He regarded preparation for examinations as a most important mental discipline, and he believed that "sluggish contentment is the enemy of all progress in individuals, institutions, and communities." Possessed of a wonderful memory, he would speak of his pupils as his "family," and upon more than one occasion he would recognize an old member of his class years afterwards, recalling his name from the tone of his voice. During his tenure of office from 1867 to 1903, no less than 10,500 names were entered upon the roll of attendance at his anatomical lectures, whilst no fewer than twenty-three Chairs, including the succession to his own, came to be occupied by men who had received their anatomical training at his hands. This record must indeed be unique. After forty-nine years of teaching and lecturing he succeeded Sir William Muir as Principal of the University of Edinburgh. As the representative of the Universities of Aberdeen and Edinburgh Turner entered the General Medical Council in 1873, but after ten years of service he resigned in favour of a representative from Aberdeen University. He was returned three years later, however, to the reconstituted Council as the representative of Edinburgh University, succeeding Sir Richard Quain as President in 1898, but he retired from this office in 1904 in favour of Sir Donald MacAlister. Turner's rule was characterized by "a forward policy, in regard both to education and discipline, and his action usually carried the Council onward in the direction which events showed was the right one." A similar policy was pursued by him in relation to educational progress, university finance and extension, for as he said : "In education there is no finality. We cannot stand still in such matters." From his knighthood in 1886, he was the recipient of many honours, including the Presidency of the British Association, but none gave him more satisfaction than his admission in 1909 to the Freedom of the City of Edinburgh. At the age of 84 he died, as he had lived, in harness. Turner's wide outlook on life, the charm of his personality, his fearless leadership, and his devotion to duty at all times and in all places, rendered him a conspicuous light throughout his active life.

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(Prepared by Mr. A. L. Clarke, Assistant Editor)

Note.—The different parts of the Society's *Proceedings* are indicated by (i) M.B.L. [Marcus Beck Laboratory Reports], (ii) R.S.M. Disc. (Infl.) [Discussion on Influenza], (iii) R.S.M. Disc. (Shock) [Discussion on Shock]. They are placed first in the bound volumes under the heading "General Reports." They are followed by the *Proceedings* of the Sections, which are arranged alphabetically, each Section being separately paged. The *Proceedings* of the Sub-section of Proctology are included in the Section of Surgery and indicated by the abbreviation "Proct." preceding the numerals. The references indicated by the Roman numerals under the headings "Med., Path. and Epid." refer to the combined discussion held by the Sections of Medicine, Pathology and Epidemiology, the report of which appears in the bound volumes immediately after the reports either of the Section of Medicine, the Section of Pathology or the Section of Epidemiology. The reference indicated by the Roman numerals under the heading "Ophth. and Laryng." refers to the joint discussion held by the Sections of Ophthalmology and Laryngology, the report of which appears in the bound volumes immediately after the reports either of the Section of Ophthalmology or the Section of Laryngology. N.B.—The Section of History is printed as a separate Supplement, with a separate index, and is only supplied to those who make application for it at the beginning of the Session.

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